FURNACES.

By R. C. KEDZIE, M. D., Member of the Michigan State Board of Health.

The following correspondence will explain itself:

EAST SAGINAW, Mich., August 3, 1874.

PROF. R. C. KEDZIE:

My Dear Sir:—In my study of the furnace matter I have come to the question as to cast iron or wrought. The wrought iron men claim that cast iron leaks deleterious gases through the substance of the iron as well as the joints: while wrought iron leaks at neither, since the seams are riveted as in steam boilers. Now to whom shall I go to settle this matter but to you?

Sincerely yours,

LANSING, August 8, 1874.

My Dear Major:—Your favor of the 3d inst. is received, asking my opinion in regard to cast or wrought-iron furnaces.

The statement of the wrought-iron men that gases will penetrate and pass through a plate of cast iron, especially when red hot, is correct. The experiments of St. Clair Deville and Troost of Paris, demonstrate this fact. They took a cast-iron stove, the walls of which were one-tenth of an inch thick, enclosed this in a cast-iron cylinder so as to isolate the air around the stove from surrounding air; the stove was heated from low-red to bright-red heat during the experiment, and the air enclosed between the stove and the surrounding envelope withdrawn and analyzed. The results of six experiments showed that this air contained on the average 562 parts of hydrogen and 557 parts of carbonic oxide in 1,000,000 parts of air.

This seems to make a strong case against the cast-iron men. But unfortunately for the wrought-iron men the same thing is true, in a less degree, of wrought iron. Graham has shown that "pure iron is capable of taking up at a low-red heat and holding when cold, 4.15 volumes of carbonic oxide gas." Deville and Troost have showed that wrought iron and even platinum are permeable by gases when heated. It is highly probable that no metal will resist entirely the passage of gases when strongly heated, but this is especially true of iron. By this permeability to carbonic oxide, Graham explains the process of converting soft iron into steel. The experiments of Deville and Troost were undertaken, not to show the objectionable qualities of cast iron for stoves and furnaces, but to show that porcelain should be used instead of iron of any kind for such uses.

The very important fact has been brought to light that while all metals may be permeable by gases at high temperatures, yet at lower temperatures they very effectually resist their passage. One condition of safety is that we should not heat our stoves or furnaces to a high temperature. By increasing the size of the heating surface we may adequately warm the air without any part of the heating surface being heated to such an extent as to allow the passage of gases through the

vantages over human lymph, but the crust is superior to both.

The history of the late epidemic of small-pox in Baltimore, confirms the truth of these views. Doctor Conrad, the resident physician of the Small-pox Hospital, reports 1,246 cases treated during the years 1871, 1872 and 1873, and, speaking of the remarkable susceptibility of the Germans, says: "No nation on the globe has such rigid laws of cumpulsory vaccination as Germany, no people are so thoroughly vaccinated ; about every one presenting from one to eight, and even sixteen vaccine marks (done in infancy), and yet it is astonishing the number suffering with even dangerous forms of the disease, in some cases unmodified altogether. The fact of so many Germans having marks, apparently of good quality, and yet such grave degrees of variola, led me to make more careful observations of the marks which I found on their arms, as compared with other races and nations. It soon struck my attention that the German cicatrix or cicatrices—for they rarely had less than three—had a less number of foveations, or thimble-like depressions in each mark (while the marks themselves presented a greater display of protection) than was the case with those of the American or African; then again I found but few adult Germans who had been vaccinated since the age of puberty. These two facts alone would account for the excess of disease in the Germans, but for one other fact in comparison. The negro, who had but rarely more than one mark, and that generally imperfect (also done in infancy), *had a less degree of variola than the Germans* with all their vaccine marks. In truth, the observation forced itself upon me that one imperfect mark upon the adult negro (done in childhood) was more protection to him than the very many found on the arm of the German, done at the same age." Dr. Conrad attributes this to a peculiar individual susceptibility in the different races, but in this we are convinced he is in error, and that the difference consists solely in the character of the original vaccination, forasmuch as what he states in regard to the Germans, applies equally to other foreigners vaccinated in the same manner.

One word in conclusion, in regard to the number of punctures or vesicles necessary to protect the patient. In Europe, as we have already seen, three or four are usually made, but with us, one is found to be sufficient. From it we get all the constitutional effect necessary without any undue local irritation. Jenner and his followers made but one puncture, and we are content to abide by the decision and practice of the early fathers.

THE NEW BONNET AGAIN.—"Wife, do you know that I have got the pneumonia?"

"New monia, indeed! You're the most extravagant man I ever did see—to go and lay out money for such trash when I need a new bonnet so much!"

metallic walls. From a false ecomony our furnaces are made small, and then to secure a sufficient degree of warmth in the air the furnace is heated often to a red heat, when they become the source of danger by allowing the passage of the carbonic oxide, the most deadly gas known; and its poisonous effects are shown in the intense headache, the head often feeling as though compressed by a tight iron hoop, languor, oppression of respiration, and general disturbance of nervous functions. But if the heating surface in the furnace is so large that the requisite amount of heat may be secured without raising the temperature of any part of the furnace walls above 500°, this danger may be obviated so far as it prevents the direct passage of this gas through the metallic surface.

It is very necessary that the products of combustion within the furnace should not escape through cracks or joints in the walls of the furnace. For this purpose the castings should be as perfect as possible, and any openings be closed with some indestructible cement. One very important condition for obviating the leakage of the furnace gases into the air chamber is to facilitate the escape of the smoke by an ample smoke-stack and a good draught. The practice of placing a damper between the furnace and the smoke-pipe, and thus regulating the activity of the combustion in the furnace by checking the escape of the furnace gases, is worthy of all condemnation. The same is true of dampers in stove pipes. They tend to throw into inhabited portions of the house the deadly products of combustion which should be allowed the freest escape by the chimney to the open air. The only place where a damper should be used, either in furnace or stove, is where it may regulate the access of air to the fire, and thus check the combustion by shutting off the air to feed the flame. When we interfere to prevent the escape of gases from the furnace, we add a stong force to drive these poisonous materials into the air of our houses, and thus place a club in the hands of death. If we reverse this condition, allowing the freest escape up the chimney while regulating the access of air to the fire, we have the draft of the chimney acting as a force to restrain the escape of gases, either by transpiration through the metal or by leakage at the imperfect joints in furnace or stove.

One fact in favor of cast-iron surface has been generally overlooked, viz.: that it is a better radiator of heat than wrought iron, and consequently will more effectually heat the air passing over its surface than wrought iron at a corresponding temperature.

There has been considerable discussion on the subject of wrought-iron and cast-iron stoves and furnaces in the Eastern States, where anthracite coal is the usual fuel. Where anthracite is used the subject becomes more important, because it is so difficult to completely burn anthracite, i. e., to convert the carbon into carbonic acid instead of carbonic oxide.

Where wood or soft coal is used this subject is of less importance, because it is much easier to completely burn these forms of fuel. While the carbonic acid is injurious, it is very much less dangerous than carbonic oxide. But whatever the kind of fuel, we should seek to secure its complete combustion, and the perfect removal by the chimney of all the products of combustion.—*Lansing Republican.*

ADULTERATED HOUSES.

SOURCES OF DISEASE IN LONDON DWELLING HOUSES—A QUESTION WORTHY OF CONSIDERATION IN NEW YORK.

Most of our disease and a great deal of our crime comes from a single source. Men and women are unhealthy because they live in unwholesome houses; they have recourse to drink partly because the act of getting it takes them out of their houses, and so is in itself attractive, and partly because the physical depression caused by ill-health makes a stimulant of any kind unnaturally grateful; drinking begets drunkenness, and when that stage is reached crime follows in many cases as a matter of course. No one denies this succession of cause and effect; on the contrary, the moral and physical mischief done by unwholesome houses is one of our chief sanitary commonplaces. Yet in no one respect are our sanitary legislation and administration so defective as they are with regard to houses. There are building acts in abundance, and in London, at all events, if the owner of a house wants to make a room lighter by throwing out a bay window or to shelter the inmates from the rain by making a covered way from his door to his garden-gate, he finds that he has to negotiate matters with the local surveyor, and perhaps after all he is not allowed to improve his own property. If, on the other hand, his desires take a negative form, and all he wants to do is to omit some sanitary precaution, he has no difficulty in keeping the surveyor at arm's length. Only the other day for example, it was stated on good authority that many of the newer parts of London, in which the houses have all been built since the existing laws were in force, are without any adequate drainage. Londoners have been burdened with debt and taxation to construct the main drainage works, but the equally important consideration how the drains of each separate house are connected with the main sewers is left to the carelessness or the parsimony of individual builders and landlords. What the state of things is in those parts of the town which are now veneered over with respectability and stucco is well known. The medical officers of health never make a report which does not condemn a number of houses, sometimes whole streets, as unfit for human habitation. They have been doing this for years past, and it would be an interesting subject of inquiry how many of these condemned houses are still inhabited. Occasionally a vestry makes a raid upon some of the worst—or, perhaps, to put it more accurately, upon those among the worst which are not the property of vestrymen—and some faint semblance of a clearance is effected. But the aggregate of unwholesomeness is not, we suspect, much reduced by these intermittent displays of sanitary virtue. And about the better class of houses, as to which doctors and sanitary engineers give such discouraging evidence, nobody troubles himself at all. The sepulchre is newly whitened every three years, according to the stipulation in the lease. But the lease says nothing about the unclean-

septum is cut through by bone-forceps; after which the bony parts are carefully sawn, and the right nasal bone is raised from its union with the maxillary. The whole nose can then be turned over on the right cheek, and replaced after the removal of the tumour. Or half only of the nose may be treated in the same way, by making the division between the nasal bones, and leaving the septum and the parts on the sound side uninjured. Dr. von Bruns has employed this method in three cases. In one of them, it was necessary to keep the nose displaced for three weeks; but at the end of that time, after the edges had been freshened, union rapidly took place. He says that this operation facilitates the removal of tumours and the arrest of hemorrhage; that it gives the surgeon the opportunity of watching the parts for some time, so as to perform any further operation that may be necessary; and that recovery takes place soon, and without any impairment of function. — *Brit. Med. Journ.*, June, 1872.

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Fever and the Sewers.—[That sewer emanations are deleterious to health we are not prepared to deny; but we may state that we have some doubts as to their being the sole cause of the diseases ascribed to them, and it seems to us yet to be proved that such gases were the cause of the typhoid fever which afflicted the Prince of Wales some months since. The following statement seems to support these doubts.]

After all that has been said at the time of the Prince of Wales' illness, the public will be glad to learn, on authority, that the men employed in the sewers are not only not carried off by fever, but appear singularly free from the ravages of that disease. At the instigation of Dr. Brewer, the Metropolitan Board of Works ordered a return on the subject, which has just been issued, and is quite conclusive.

Out of 5 inspectors employed from 23 to 48 years, there has never been a case of fever. Out of 64 men employed in cleansing and flushing the northern sewers for periods varying up to 34 years, only 2 have had fever, and their cases were typhus. Out of 47 men engaged in the sewer work in the southern sewers for periods varying from 1 to 24 years, there have only been 2 cases of fever, and these again typhus, and in one of these cases it is shown that the disease was contracted from the man's family. There are 36 penstock and flap-keepers who have been employed from 1 to 50 years. Of all these, only one has had any fever. He has been 16 years at work, and had typhoid in 1862. There are some curious notes about these men. One of them has been at this work 50 years, and has not had one day's illness during the time. One lived 25 years in the sluice house over the King's Scholars pond sewer, but never had any fever. Another lived for 14 years in Penstock House, over outfall sewer at Old Ford. Another lived 32 years in Great St. John's sluice house. Another lived for 35 years in a house over Duffield sluice, and enjoyed good health. Out of 54 men employed at the pumping stations, there has only been one case of fever (typhoid).

At Crossness, out of 54 men engaged during the last 6 years, there has not been one case of typhus or typhoid. There have been 8 cases of ague, but these are of course due to the low marshy district, and they seemed to have recovered rapidly. Out of 7 men employed in cleansing ventilators, oiling side entrances, gauges, &c., no case of fever has occurred, though one man has been at the work 23 years. Of 10 surveyors and chainmen in the engineer's office, not one has ever had typhoid fever, although they have been almost daily engaged in the sewers for periods of from 4 to 24 years.

These facts are very gratifying, and quite dispose of the allegation that the men in the sewers are decimated by fever. The statistics show, in fact, that fever is less prevalent amongst these men than the rest of the town population.—*Dublin Med. Press and Circular*, April 10, 1872.

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Recent Epidemic of Variola at Leipsic.—Prof. WUNDERLICH states (*Archiv der Heilkunde*) that smallpox has prevailed more severely at Leipsic than in other places in Germany during the recent epidemic, and that in consequence of the

great neglect of vaccination and revaccination which has ensued upon the agitation of the so-called "nature-doctors." Until recently epidemics have been very few, and attended with a very slight mortality. During the years (1852–69) that he has been Director of the Municipal Hospital, there have been admitted 663 cases, furnishing only 29 deaths; and during the years 1868 (when the cases increased to 150) and 1869 (when they were 108) the deaths were only 10 and 3 respectively. The deaths almost exclusively occurred among the non-vaccinated; for while the general mortality from the disease was 4¼ per cent., that of the unvaccinated was 33 per cent. It was not until quite the end of 1870 that the epidemic seemed to be taking on large proportions, but from then to February, 1872, 1727 cases have been admitted; and although the number of admissions has gradually diminished since July, 1871, the epidemic can scarcely be regarded as terminated. Of course temporary hospitals (in the form chiefly of sheds) had to be provided, and among other contrivances the erection of a "station" for *suspected cases* proved of great value, as it had done formerly in cholera outbreaks. Many cases were sent to the hospital as smallpox, in which the diagnosis was not confirmed; others, which in the hospital were yet doubtful, were transferred here, so that they might be watched; and they were either discharged or returned to the hospital as the course of the disease indicated.

Of the 1727 patients 139 had not been vaccinated, 22 had already had variola, 1504 had been vaccinated, and of 62 no account could be got. In 79 revaccination had been performed, giving rise to pustules only in 13. The large proportion of the cases occurring in the vaccinated must excite surprise; but in point of fact a small proportion only of the population is unvaccinated; and infants, who constitute the great proportion of cases in the unvaccinated, are only brought to the hospital in direful emergencies. The present epidemic has been remarkable, not only for the number of cases, but for its great fatality. While during the last eighteen years the mortality from smallpox has averaged 4¼ per cent., in this epidemic it has nearly reached (253 deaths in 1727 cases) 14.7 per cent.; and, making allowance for some of the deaths being due to other causes, the fatality has at least tripled itself. Of the 139 unvaccinated there died 99, or 71 per cent.; and of the 62 in whom it was doubtful whether vaccination had been performed, 32, or 51½ per cent., died. Of the 22 persons who had smallpox for the second time, 6, or 23 per cent., died. Of the 1504 vaccinated, 116, or $7\frac{7}{10}$ per cent., died. None of the 13 successfully revaccinated died. As the epidemic diminished, the mortality became not only absolutely but *relatively* less. The observation applies during the whole eighteen years over which this account ranges, that the relative mortality is increased with the number of cases. Thus, with 168 in 1857, it was 5 per cent.; and in 1868, with 150 cases, 6½ per cent.; while in the fifteen other years, during which the cases averaged 22, it was only 3⅔ per cent. In the present epidemic it has reached 14.7 per cent. *Sex* exercised little influence on the mortality, but a very different account is to be given of *age*. Of 116 children under 15 years of age there died 73, or 63 per cent.; while of 1611 persons above that age there died 184, or 11⅓ per cent. The contrast is still more remarkable in unvaccinated infants. Of 29 such under 1 year, 27 died. and of 31 under 2 years, 27 died. This influence diminishes in the third year, when of 15 unvaccinated, only 8 died; and of 23 between 4 and 8 years, only 7 died. The effect of vaccination in early life is strongly brought out by the fact that not a single vaccinated child of 8 years or under was brought to the hospital. The number of unvaccinated children of this age amounted to 100, and of these 69 died.

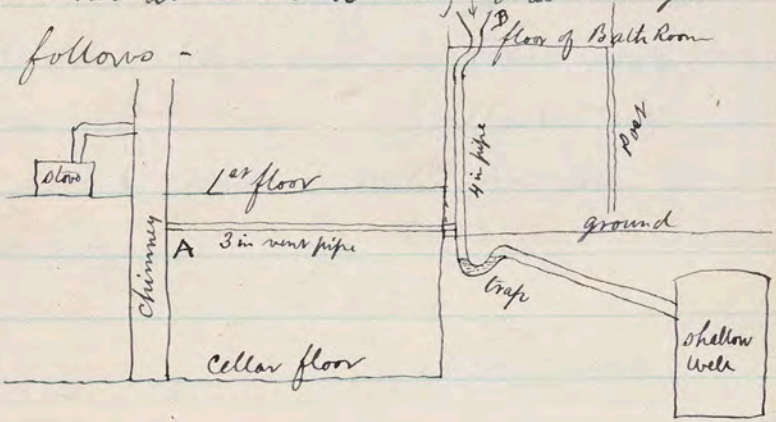
As still further illustrating the benefits of vaccination, it is stated, that, while, of 11 unvaccinated between 9 and 14 years, 4 died, none of the 20 vaccinated died. Between the years of 15 and 25 there were 11 unvaccinated with 4 deaths, and 801 vaccinated with 23 deaths. Of the 18 unvaccinated above 25 the whole died, while the mortality of the 671 vaccinated

~~Country house privies & drinking wells;~~
~~& Water Closets~~

Shirl 10/22.75

Dear Prim Dr H. Harbstrom -

The plan of water closet which was perfectly secure all last summer at Atlantic City was arranged as follows -



The brick chimney rests on cellar floor & the vent pipe connects at A. The trap prevents the flow of air from well and there is a constant motion of air down the seat at B - The servants closet is an air light cemented drop with a vent pipe to same chimney the only

place where air can enter living at the seat - this has proved entirely satisfactory.
The water supply was from a rain water cistern in the cellar - pure & cold for house use and a driven well for watering flowers & laundry use - all the kitchen waste is taken away daily from all houses in Atlantic City & carried some 3 miles from town to feed hogs &c -

My friend
W B Shoudy

W. E. Rhoads

W. C. ventilation

HOW TO AVOID SEWER GAS POISONING.

"The Artizans', Laborers', and General Dwellings Company," of England, is an organization devoted to the general purposes of improving dwellings and the condition of the laboring classes by the erection of houses with the best sanitary arrangements, suited to tenants of moderate means, and purchasable on easy terms. From a recent number of the London *Engineering*, we learn that:

"In making the drainage of their houses, the company invariably, and as a fixed rule, avoids carrying the drains under any portion of the houses. Instead of this a drain is arranged at the backs of two rows of houses, running lengthwise in the gardens, and into the main drain. The drain pipes are led from the backs of the houses instead of beneath them, and hence into the street, as is generally done in all other modes of house drainage. This plan they have carried out in the houses they have built at Liverpool, Birmingham, Salford, &c., and they are adopting it near London at the Shaftesbury Estate, where they have already erected 800 and are constructing 400 more houses. It has been found that wherever this plan has been adopted the death rate in these houses, compared with that of a similar number of ordinarily drained houses, has been much less.

"The reason of this is self-evident. As the sewage is at once removed from the back of the house into the main drain at the end of the garden, there is no possible chance of the production of sewer gas, because the latter has neither time nor place to generate. Again, if the drain requires any repair, this is easily and safely effected, because it is external to the house, whereas in all other ordinary methods a portion or sometimes the whole of the lower part of the house must be disturbed to seek and remedy the cause, leading to the most dangerous exhalations for many days passing into the house. Again, no danger can arise from defective joints or bad trapping, simply because the house drains have no connection with the street sewers, except the very remote one arising from the connection with the drain in the garden. But danger from this is evidently impossible, from the rapid method by which the sewage is conveyed from it into the street or main sewer.

"Taking the whole of the metropolis, it would be a difficult matter to find many houses in which the entire drainage is not conveyed at the basement, from the back, *through the house*, and thence by the front into the sewer. The traps are placed in the closet and the sinks, consequently the pipes running thence are continually full of sewer gases. Two evils thence arise. In the first place, the water in the traps dissolves the sewer gases, which thence pass into the house both by closet and sink; secondly, the pipes themselves, being necessarily imperfectly jointed, constantly leak. Consequently, it is no exaggeration to state that there is scarcely a house in London in which sewer gases are not nearly always present, although they may not be smelt until a falling barometer indicates a reduced atmospheric pressure, when arises that sure house indication of rain, the smell of the drains.

"The method of trapping drains between the house and the sewer is certainly an improvement, but, still, only a very partial one, as will be

range of all climates, altitudes and soils, with the hygienic influences peculiar to each." Hitherto, our hygienic knowledge of a large portion of this vast region has been derived from the letters of travelers in search of health, adventurers' reports, and some stray treatises on particular places or points—each giving an experience of narrow limits, at most, and of but little permanent value. From such reports there has unquestionably resulted much error. The salutary influence of the new territories has been overrated and lauded by persons who have had but little knowledge and exceedingly limited opportunities. But in the volume before us we have the ground covered by the highest order of intelligence, and with a wholly different purpose, the care and preservation of the health of numerous bodies of men in their special keeping, subject respectively to the same conditions.

The opinion of the majority of medical officers is, that altitude and a rarefied atmosphere are not *per se* beneficial in cases of phthisis, but that it is the dryness of the air, the exercise, and the out-door life which produce good results in those cases which are "able to stand it."

THE CALIFORNIA CLIMATE.—San Franciscans make a hobby of their climate. They roll it as a sweet morsel under their tongue. It is their *pièce de résistance* in the catalogue of blessings. "The derned place seems shaky on her pins," said a citizen just after the great earthquake of 1868; "but there's one consolation, anyhow, we've got the best climate in the world." It is a climate of strong contrasts. It is eccentric; it is tantalizing; it is seductive. We are piqued at its capriciousness, yet it unfits us for living anywhere else. Summer hardens into winter; winter is glorified into summer. Roses and sunny skies in January; verdureless waste, cold winds, and chilling fogs in July.

"Did you ever see such a summer as this?" said one Irishman to another.

"No, be jabers, not since the middle of last winter."

We cry for thick blankets while you are sweltering in the dog-day heats; we throw open our doors and windows while you are cowering beneath the sharp stings of winter. Not that all days in summer are cold, and all days in winter warm; but the general rule is, that June, July, and August are detestable, and the rest of the year unequaled for loveliness of weather. There are not only days, but weeks, when the skies are indescribably glorious. The Nile Valley is not so sweetly balmy, Southern Italy not so rich in mellow splendor. The golden sunshine permeates every pore, quickens every pulse of life. The air has an indefinable softness and sweetness—a tonic quality that braces the nerves to a joyous tension, making the very sense of existence a delight. The contrast of temperature between summer and winter is less apparent than real. The remarkable equability of the climate will appear from the following: In June, 1874, the highest thermometer was 67°, the lowest, 58°; in January of the same year, the highest was 59°, the lowest, 54°. In December, the range was between 60° and 52°; in August it was between 68° and 60°.—*Samuel Williams; Scribner for July.*

NEW YORK MEDICAL LIBRARY AND JOURNAL ASSOCIATION.

Stated Meeting, June 11th, 1875.

DR. E. R. PEASLEE, PRESIDENT, in the Chair.

DRAINAGE.

THE Association listened with interest to remarks made by Gen. Egbert L. Vielé, upon the subject of drainage. He had been announced to read a paper upon "House Drainage," but he purposely avoided confining himself to this particular topic, as it bears about the same relation to the general subject of drainage as the space occupied by a fly does to the subject of the globe. The speaker started with the proposition that saturated soil is the principal cause of preventable diseases, and the great element which physicians (especially of this city) have to contend with in their practice. The New York Association of the Board of Health would limit the subject of drainage almost entirely to the work of the plumber, but the field is much wider, and drainage has to do with the dryness of the soil exterior to the premises and also in the cellar. Confining his remarks to the city of New York, the speaker traced upon a map the old water-supplies, swamps, ponds, etc., upon the island, and demonstrated that in many instances these ponds and swamps had been filled, and natural water-courses obstructed, without making proper provisions, indeed no provisions at all in many instances, for drainage. It is an idea which he had found entertained by very many well-informed people that sewerage and drainage are one and the same thing, and that all the drainage necessary can be done by the ordinary sewer. This is a mistaken idea, and he proceeded to demonstrate that, in nearly every instance, the level of the water-courses upon the island is far below the sewer level, in some places as many as twenty feet, rendering it absolutely impossible for the water retained in the soil when these courses are obstructed to be carried off by the sewers. The result has been from obstructing these natural water-courses, which in many instances have their rise in perennial springs, that the soil underneath the houses, in many of the most wealthy portions of the city, is saturated, and is a constant source of disease.

The condition of the Harlem Flats was commented upon at some length in terms of the greatest earnestness and severity, and the opinion expressed that if there ever was reason for a Vigilance Committee there is reason for raising one at the present time, stirring up those men who insist upon filling up these streams without proper drainage for avoiding saturated soil. With regard to those houses which are situated over water-courses having a lower level than the sewers, they are always dangerous to live in. These houses should be supplied with pumps to raise the water from the cellars into the sewer, and in that way they can be made safe dwelling-places.

Cast-iron is the only material fit to be used for soil-pipes. The soil-pipe should always have a ventilation-pipe running parallel to it, connecting with the traps in the soil-pipe upon every story, and should extend to the roof of the house.

With regard to the construction of the water-closet itself, the pan-closet, the one in common use, has certain disadvantages. First, the pan is emptied at an angle and the discharge is against the side of the receiver, and there accumulates a quantity of matter which in turn becomes a source of disease. In addition, the pan itself is not always clean, and when it goes back it strikes the bottom of the closet, and there

lodges a quantity of fæcal matter each time. In this way there is constant danger of an accumulation of matter which is destructive to health. These disadvantages, the speaker explained, can be removed by a simple attachment, consisting of a pipe arranged under the bowl and around the exterior of the pan, for the purpose of washing the interior of the receptacle and the exterior of the pan and bowl, and at the same times keeping the lower traps properly supplied with water. The water is discharged from this pipe in jets.

In answer to some questions, the speaker remarked that sewer gas is forced into our dwellings under certain states of the atmosphere, and to overcome this thorough ventilation of the sewers should be established, which can be done by erecting sewer-shafts having induced currents of warm air within them. Such induced currents are readily established by means of gas-lights in the shaft.

A vote of thanks was extended to Gen. Vielé for his interesting discourse, after which the Association adjourned.

Correspondence.

HOW TO PREVENT MISTAKES IN PRESCRIBING AND DISPENSING MEDICINES.

To the Editor of the Medical Record.

Sir:—The question has often suggested itself to my mind, In what way can the physician and druggist insure the utmost possible safety to the patient in taking the medicine that the one has prescribed and the other prepared? It is, of course, the great desideratum of physicians in prescribing, and in the druggist in compounding, to have the prescriptions accurately and *safely* prepared; but in many cases it does not by any means follow, that because the prescription is accurately prepared, that it is safe to administer the medicine as prescribed. It often occurs that a prescription which has been prepared strictly according to the directions of the physician, would be attended with unhappy, and perhaps fatal results if administered to the patient. The principal object of the physician, the druggist, and the patient is to have the medicine prepared with the greatest care from the best and purest material, and when that has been done, the functions of the druggist cease, and he has apparently no farther connection with the case; yet, if any error has been made by the doctor, either by overdosing or by ordering the wrong article in prescribing, and harm comes therefrom to the patient, the druggist is equally held to blame, although he may have dispensed exactly as the physician directed, who alone should be held responsible, *unless* he, in prescribing, wrote the directions on the prescriptions, thereby showing the druggist just how the medicine was to be used, and in what doses, thus giving him an opportunity to correct whatever errors the physician may have made in the prescription. The druggist who would dispense a fatal or overdose in such a prescription would be much more to blame than the physician who ordered it, as such a case would be the result of either his own gross ignorance or carelessness. Now, in order to prevent as far as possible all errors, what system or plan is there in prescribing, which, if adopted by physicians, will be most conducive to the mutual safety and protection of the three

Modes of action of disinfectants:

[Fresh Air, — Water — used with Soap]

1. By absorbing gases & preventing their emanation;
as dry earth — lime — charcoal.
~~Soap~~ —

2. By neutralizing H_2S — as nitrate of lead solution — & chlorine —

4. By disorganizing dead organic matter;
Chlorine by affinity for H, & setting free O;
Chloride of Lime — Chlorinated Soda —
Iodine & Bromine the same,
Permanganate of potassium, by giving Oxygen.

3. By arresting septic changes in organic materials:
SO_2 & NO_4 (by taking oxygen)
Chloride of calcium (& affinity for water)
Chloride of zinc, chloride of iron, &
Chloralum, chloride of calcium,
Sulphate of iron (by oxygen).
Carbolic acid, (& creasote —
coal tar wood tar)
(by affinity for water, & by combining with
albumen & other organic principles.)

5. By killing organic disease-germs — water said
Carbolic acid 1 part in 500 water — 1 in 100
Salicylic acid to arrest fermentation — 1 in 100
Cold — 1 part in 300 to 800. to kill small animal
Heat.

But we need not dwell at all on the facts because first they are obvious & undoubted & second they do not admit, the effect of cold does not arrest the effect of any other application to prevention of disease or disinfection.

Let me recapitulate my account of disinfectant agents & agencies in a brief summary —

The value of sulphate of iron does not rest, it must be remembered, upon theory only, but also upon experiment. In the *Zeitschrift des Oester.-Apothek.-Vereines*, February 10, 1873, Albert Eckstein published an account of his attempts to disinfect a privy which was used daily by one hundred persons, and the results are so interesting that they are here transcribed:

1. Two pounds of sulphate of iron in solution. After from two to three hours all bad smell had disappeared, but in twelve hours all the influence of the disinfectant was lost.

2. Sulphate of copper in solution, the same.

3. Two pounds of sulphate of iron in crystals; their effects lasted two days.

4. Sulphate of copper, the same.

5. Sulphurous acid in solution rapidly lost its effect, and was exceedingly irritating to the respiratory organs.

6. Two pounds of impure carbolic acid filled the house for two days with such a disagreeable smell that it was impossible to tell whether the original odor was destroyed or covered up.

7. Two pounds of sulphate of iron in a parchment sack exerted a disinfecting influence for three full days, and when the parchment sack was drawn up it contained only some dirty, odorless fluid.

8. Two pounds of the best chloride of calcium in the parchment sack disinfected the privy for at least nine days.

H. C. W., Jr.

(To be continued.)

in such a position that he cannot protect himself in any way. Such a diarrhœa may even be maltreated and still it will not lead to cholera, but will resolve itself in time, even though it may have reached such a grade as to have been called cholerine or even cholera.

"But if albumen be found in the urine of an individual suffering with diarrhœa—with cylinders and kidney epithelium under the microscope—still the diagnosis of cholera is not absolute of course, as other affections may bring about this condition; yet as this manifestation is constant and never failing in cholera, as the collapse and typhoid condition are only observed in this condition, such a diarrhœa is to be diagnosticated as cholera when the other affections productive of albuminuria are excluded.

"It matters not whether the symptoms be light or severe, when albumen presents in the urine it establishes the existence of true cholera, and the graver symptoms will manifest in a short time.

"The author concludes his paper as follows: New observations have only confirmed me in the opinion before expressed that '*however severe and apparently choleraic the symptoms may be, the disease is not to be considered as true cholera if albumen be absent in the urine; on the other hand, the most anxious attention is to be directed to a case even in the earliest diarrhœa when the urine is albuminous.*"

MISCELLANY.

FRECKLES, it is said, are removed by the application, twice a day, of powdered nitre moistened with water.—*Southern Med. Record.*

Dr H. J. Von Ankum found

the following facts: Atmospheric air, to which are added the vapours emanating from carbolic acid, is unable to hinder the development of lower organisms in water with hay, in milk, and in urine. He put those substances under a glass bell, with an opening at the upper side, and surrounded by little cups filled with carbolic acid. All was placed in a ventilating closet, and the arrangement was such that the air that passed the above-named substances was mixed, if not saturated, with the vapours of carbolic acid. After the lapse of a little time, the development of lower organisms took place just as if the fluids had been exposed to the free air. Von Ankum made use of pure and impure carbolic acid, and only once he saw, in using the impure strong-smelling carbolic acid, the formation of those organisms was retarded, and did not take place in so many forms. He concludes, from his experiments, that no disinfecting action can be expected from the vapours of carbolic acid when they are mixed with the atmospheric air in such quantity that the respiration can take place in it without damage.—*Med. Times and Gaz.*, Dec. 16, 1871.

carbolic acid

—

...lungae.—At a recent meeting of

Mortality from Smallpox in Philadelphia.—The deaths from smallpox during the past four weeks were as follows:—

Week ending Dec.	30,	1871,	.	.	223
" " Jan.	6,	1872,	.	.	230
" " "	13,	"	.	.	216
" " "	20,	"	.	.	209

Philadelphia Hospital.—Dr. James Tyson has been elected curator to the Pathological Museum of this hospital to fill the vacancy caused by the resignation of Dr. Wm. Pepper.

FOREIGN INTELLIGENCE.

Croton-chloral.—Dr. Oscar Liebreich, to whom we owe that valuable agent, hydrate of chloral, has lately been engaged in investigating the physiological and therapeutical properties of a new organic compound called croton-chloral, which is formed by conducting chlorine gas into allylene. A peculiar action of this new substance in animals is, that at first a high degree of anæsthesia in the head is produced, while sensibility in the other parts of the body remains intact. The second stage is, that the spinal cord loses its function and reflex

Dec 25/75.

Original Communications.

BACTERIA: THEIR NATURE, AND RELATION TO DISEASE.

By THOMAS E. SATTERTHWAITE, M.D.,
SURGEON TO THE DEMILT DISPENSARY, ETC.

(A portion of this paper was read before the Medical Society of the County of New York, Nov. 22, 1875.)

PART II.

THERE is one fact to which a mere allusion has been made, and another that has not yet been mentioned, both of which must be briefly stated, otherwise we shall not be prepared to understand the relation of bacterial organisms to certain definite forms of disease.

The one is the relation of bacteria to putrefaction, and the other to septic processes. It is generally known that Pasteur formerly held that fermentation and putrefaction were initiated by organisms, but it appears, according to excellent authority,* that he has been obliged to alter these views, for it has been shown that "grapes suspended in an atmosphere of carbonic acid will undergo fermentation so as to generate alcohol and other products, even without the presence of torulæ and other organisms." The experiments of Le Chartier and Bellamy have also shown that in some forms of fermentation independent organisms are often at first absent, though they afterwards make their appearance.†

In regard to putrefaction, Hiller‡ also has shown that if fresh eggs be put into a basket with rotten ones, the former will soon be contaminated, showing that contamination takes place through the air. He then injected fresh eggs with a fluid containing bacteria, but not putrid; the eggs remained unchanged, showing apparently that bacteria of themselves do not necessarily produce decomposition.

But it is alleged that in the processes called septic there is always evidence of the presence of bacteria, the intensity of the affection and the limits of its spread having a close relation with the existence of such bodies. These processes may be advantageously studied by inoculating animals with various putrescent substances, such as infusions of muscular tissue, the sputa of phthisical patients, the scrapings of anybody's tongue, which soon become very offensive. These all, when introduced into the tissues of animals, such as rabbits, produce a peculiar train of symptoms, characterized by extreme constitutional disturbance, culminating frequently in death, most often at the end of forty-five to forty-eight hours, the lesions being a focus of inflammation with extensive effusions of serum about it, thrombosis of vessels, and if death do not occur at an early period, the formation of a foul deposit, consisting of pus and granular débris, with which are associated myriads of bacteria, in more or less active motion. Whether these putrescent substances or the fluids of septic diseases are inoculated, the results are about the same.

These poisonous substances generally, if not always, contain bacteria, or are a favoring medium for them, and experiments have shown conclusively that when sepsis is produced by them, its lesions are accompanied almost invariably by a coextensive spread of bacteria.

Upon this point there can be no doubt; but the question has always remained whether the poisoning is of itself produced by the bacteria, or some other substance present, but not bacterial in nature.

The experiments of Panum,* of Copenhagen, have been directed towards the solution of this question, and they appear to be the most complete that have been recorded. He seems to prove that influences such as will kill bacteria (for the rod forms do not appear to be able to withstand the temperature of boiling), do not prevent the inoculability of septic matters. He boiled putrid matter that had produced infection in rabbits, maintained the boiling temperature eleven hours, and then subjected it to various other conditions, but the liquid still was virulent.

Onimus† and Hiller‡ have worked in the same direction. The former claimed to have shown that the poisonous quality of putrid blood might be independent of bacteria or vibriones (by vibriones meaning probably some form of the bacteria already described, and not the long and bent filaments that have lately received this name). He also showed that blood with these organisms might still be innocuous. He concluded that the poison was an albuminous substance, though this conclusion does not appear to have been warranted by his experiments.

Hiller proposed to himself the following questions:

Do bacteria possess the property of exciting inflammation when they are present in living tissue?

Or, if in the blood, do they cause fever?

Can bacteria multiply in living tissue?

Do they have the capacity of penetrating living organs?

His experiments were conducted on animals, and he used the bacteria obtained from various kinds of decomposing substances. The animals exhibited no septic symptoms, though on the second day the temperature rose, but not over 2° Fahr. On the third day, when the points inoculated were opened and examined, some shrivelled bacteria were found, but on the eighth day there were none. When bacteria were introduced into the blood currents they gradually disappeared, and finally could not be found at all, though in blood exposed to the air they multiplied rapidly. Two points have thus come vividly into notice.

1. The symptoms and lesions of putrid poisoning just described, and those of septic diseases, as frequently described, in so far as experiments on animals are concerned, resemble each other so closely that no differential marks can well be shown.

2. That bacteria are not necessarily associated either with putrid infection or sepsis.

It is convenient here to notice a plan that has been adopted by some experimenters, by which very important advances have been made in determining the nature of the poisonous matter, though chiefly in vaccine virus. It appears that Chauveau was the first to carry out the plan successfully, though Sanderson had previously employed a less perfect method. § It had in view the absolute isolation of the virulent principle, the method being *diffusion*. Sanderson attempted to determine if the poison of the cattle plague was crystalline or colloid. He passed the virulent fluids of these animals through parchment-paper; the diffusat was wholly innocuous, the liquid that remained behind very poisonous. He therefore argued that the *contagia* were colloid. This conclusion, however, was unwar-

* Bastian, Lancet, April 10, 1875.
† Loc. cit.
‡ Centralblatt, 54, 1874.

* Virchow's Archiv, LX., iii., and iv., 1874.
† Lond. Med. Rec., Nov. 19, 1873.
‡ Allg. Med. Central. Ztg., 2, 1874.
§ Twelfth Report of the Med. Off. of the Privy Council, 1869, p. 2[illegible]2.

See back page for Continued

ranted, as also that of Onimus in the plan already described, because it is now known that albuminous substances will sometimes pass through a membrane in small quantities, especially in the presence of the carbonates and phosphates (Graham* and Schumacher†), and therefore neither Onimus nor Sanderson could conclude that the fluid which remained behind the membrane, and was poisonous, owed this quality to the albuminous substance, for it is very probable that there was also albumen in some form in the clear filtrate that was harmless. This error was early observed by Sanderson.

The precise points in Chauveau's inquiry were, whether in vaccine lymph the infectious principle resides in the leucocytes, the liquid, or the minute particles contained in it. He first employed a method called *subsidence*, which had the effect of separating the leucocytes. Ten volumes of water were added to the lymph, and then the mixture was allowed to stand. The leucocytes thus separated produced no lesion. To decide between the granules and the fluid holding them, he employed filtration and then subsidence, but was unable to separate them. His *special diffusion* method, however, was successful. His plan was as follows:

Taking the vaccine lymph in the capillary tube in which it was collected from the arm, he introduced it into an upright test-tube, of the form represented in Fig. No. 2. Great care was taken that the liquid did not touch the sides of the glass in the act of filling. Water to the depth of a few lines was then added, with similar precautions, and the whole allowed to stand for twenty-four hours. Although no membrane was used, yet it is said that if proper care was exercised, the liquids did not mix, except in the immediate neighborhood of the surface of junction.

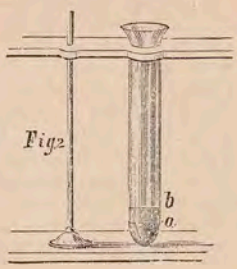


Fig. 2

All of the soluble constituents of the vaccine passed upwards into the water. At the end of the twenty-four hours the most superficial layer (*b*) was removed by dipping into it the end of a fine capillary tube. The liquid in the tube was then examined microscopically and tested for albumen. Now albumen, though held to have the least diffusibility of chemical compounds, was found in the water, the inference being therefore that no other soluble chemical matter had been left behind. This upper stratum was used for the inoculation of heifers and children, but without success, while the lower stratum (*a*) produced the disease. It therefore appeared that the poisonous quality did not reside in the leucocytes, the albumen, or other soluble chemical bodies, the conclusion being that it was in the granules. (It may here be stated that in all these poisonous liquids, the clear fluid—such as passes through a porous clay filter—is never inoculable). Sanderson carried out this method with more attention to details, and corroborated Chauveau's conclusions in the great majority of his experiments. The fluid that was poisonous was not turbid, as it is when it contains the ordinary bacteria, but it *did* contain granules, though they were so small as to be recognized with difficulty by the ordinary powers of the microscope.

One of the very best methods to determine the character of *contagia* is that used by Panum in his inquiries into the nature of the virulent principle in putrid infection.

The method is not difficult, and promises good results in other inquiries of a similar nature.

Panum took a putrid infusion that by inoculation on animals had been shown to produce the symptoms of sepsis, then boiled it for eleven hours, and after filtering it several times, eliminated the bacteria, as he claims, but it was poisonous. Having then taken this clear liquid and evaporated it to dryness, and extracted it with alcohol, the alcoholic fluid extract was inoculated, but no infection followed. The dry alcoholic extract or precipitate was then taken, and an aqueous extract made of it. It was inoculated, and produced septic symptoms. He therefore concludes that there exists in decomposing substances a determinate chemical substance which (*a*) is not destroyed by boiling; (*b*) is soluble in water, but (*c*) is insoluble in alcohol; though he is uncertain as to the nature of the poison, thinking perhaps it is secreted from the bacteria, and perhaps that it arises from the decomposition of albumen. He alludes to the experiments of Bergmann, who separated the bacteria from Pasteur's fluid, injected them, and got up sepsis. These same results may be observed when the bacteria from Cohn's nutrient fluid are filtered out and inoculated.

But it must be remembered that it is by no means probable that the bacteria alone are filtered out. In such a fluid, as also in Cohn's, there is organic matter; in fact the tartrate is in both, and in the fermentation which takes place soon after the fluid is made, there are a variety of new chemical combinations some one of which may be poisonous and attach itself to the bacteria, which may then be carriers of the poison, though not poisons themselves. Such arguments might be urged by those who advocate the physico-chemical theory of disease. But even this theory is unnecessary, for, as we shall see further on, we have no means of separating these minute organisms from other particles of similar size which may represent the virulent principle.

There is one point which may be noticed here, which is, that the existence of a septic condition has sometimes been founded on the temperature of the animals; but this, as shown in some preliminary experiments by Dr. Curtis and myself, may prove very unreliable. For if the tube were introduced into the rectum, as is most convenient in rabbits, the temperature was much affected by the distance it was inserted, and variations often took place for which there was no assignable cause whatever; in fact the injection of various substances beneath the skin did not exhibit thermometric results that were accorded with the character of the material used. The most reliable symptoms of infection appear to be the lesions produced by the inoculation of septic matter. This was found to be the case by Dr. Curtis and myself in a series of comparative experiments made with another object in view. The method of performing the experiments is as follows: An incision is made over the thigh of a healthy rabbit, and the muscular bundles being cut into, the material, if solid, is inserted there, the muscular fibres drawn over it, and then the edges of the skin wound are brought together. If the material be fluid, injection is made at the same point. The external wound in all cases healed kindly by ad-

* Proc. Roy. Soc., 1861, Vol. ii., p. 243.
† Physik der Pflanzen, p. 128.

hesion, but when any putrid matter or unhealthy animal tissue was introduced, there would be intense inflammation at the point of inoculation, with thrombosis of vessels and extensive exudations in the neighborhood, death frequently ensuing about the end of the second day, and always, if time enough elapsed, giving rise to a thick, yellowish-white deposit, consisting of pus, granular débris, and imperfect forms of connective tissue, and *generally* bacteria in large numbers. At a later stage this deposit would soften, increase in amount, and give rise to a foul ulcer, which would continue to discharge for many weeks, if the animal did not sooner die during the exhausting discharge, with symptoms of diarrhœa, loss of appetite and emaciation. These phenomena are peculiarly those produced by the introduction of organic matter, especially animal, into the system, and are wholly unlike those produced by chemical irritants or foreign bodies, as experiments have shown. Injection of alcohol in considerable quantity, and inoculation of dry sand, previously superheated, produce no lesions of any note.

To determine the nature of this poison, resort was first had to filtration through common filter paper, but the results were not always uniform, though it appeared as if there was less virulence in the liquid that passed through several thicknesses of paper, yet the quality of this paper was found to vary, for sometimes no bacteria passed through a single thickness, and again numbers of them passed through four thicknesses.

Dr. Curtis then devised an apparatus by which liquids were passed through porous clay. The accompanying diagram (Fig. 3), made with Dr. Curtis's permission, is a pretty faithful copy of the original.

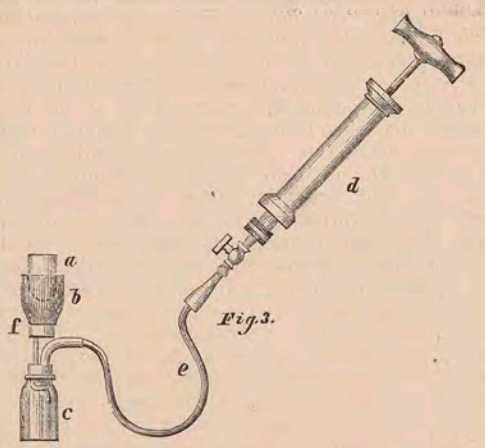


Fig. 3.

It consists of a porous clay cylinder, or cup (*a*), over the bottom of which is drawn a bit of rubber tubing (*b*), which is thick, and grasps it firmly; into the opposite end of this bit of tubing is fitted a rubber cork (*f*), through which a glass rod passes into the interior of the rubber tube. This rod is also connected with, and passes through another cork into a glass jar or receiver (*c*), from which the air is exhausted by the exhausting syringe acting through the fine rubber tube; when a liquid is placed in the porous cylinder or cup and the air is exhausted from the glass jar, the liquid passes through the bottom of the cup and stands in beads or drops on the bottom of the cylinder, from which it may be collected without much difficulty.

In carrying out these experiments it was found that the clear liquid that was obtained in this way from maceration of tongue-scrapings in water, did not prove poisonous, though the tongue-scrapings were very poisonous.

The poisonous fluid always contained granules, though it did not always show the rod forms; indeed these might be removed in some instances by filtering through from four to eight thicknesses of paper, and yet the liquid was poisonous.

These experiments seem to corroborate those of Sanderson, and to indicate that the *materies morbi* lies in the granules.

Are, then, these *particulate* bodies bacteria, or other solid matters? This indeed is a difficult matter to decide, for it has been found almost, if not absolutely, impossible to separate bacteria from the other particles, with which they are so apt to be associated.

Now, if bacteria, these must be the minute forms so often described as microbacteria, microzymes, etc., but we must remember that no definite classification of these bodies has yet been made, even Cohn leaving them indefinite, so that from bare inspection by the microscope we are not able to diagnosticate them. Nor have we found any coloring matter that shows them satisfactorily. A method was, it is true, proposed by Letzerich* to color his "diphtheria micrococcus," but Hiller has shown conclusively that this method (with iodine) is utterly unreliable, for the very rule he adopts causes a deposit of granular iodine, which has no microscopical characters by which it may be distinguished from the minuter organisms, if present: nor have chemical means given any satisfactory results; for example, caustic soda and potassa and ammonia certainly affect bacteria but little, though they destroy most animal tissues; but they also leave certain granules unaffected, such as are found in the normal blood, which is supposed to contain no bacteria.

There being, therefore, no micro-chemical means of recognizing these bodies, attempts have been made to cultivate them, so as to see whether they are capable, as claimed, of developing higher forms. It has already been noted that Billroth speaks of the "Dauersporen," or lasting spores, as bodies that have great powers of withstanding various influences, but which when placed in sealed flasks give rise to bacteria. Can these be the same as the infectious principles that Burdon-Sanderson alludes to, and were contained in Panum's watery extract of an infusion, that had been filtered, evaporated to dryness, and extracted with boiling alcohol?

The following questions presented themselves before the final experiments were made on this matter:

1. Is the poisonous matter in putrid infusions destroyed by boiling and evaporation to dryness?
2. Is it soluble in alcohol or precipitated by it?
3. Is it soluble in water, after boiling in water and absolute alcohol?
4. If there are granules in the fluid that prove poisonous, will they breed bacteria?

These experiments, done with the co-operation of Dr. Edward Curtis, were in the main those of Panum; the liquid used was obtained by making an infusion of calf's liver that had been allowed to become putrid; the liquid and solids used were inserted in the muscular tissue of rabbits, and examined at the end of seventy-two hours.

Having established, as in previous experiments, that the putrid solution itself produced septic symptoms, and that the clear filtrate which had passed through the porous cylinder was innocuous, and also that the fluid which had passed through filter paper of different thicknesses was at times poisonous and

* Virchow's Archiv, LXII., iii., 1875.

at others not, I shall mention simply the experiments relating to the questions just enumerated.

Does continued boiling and evaporation to dryness destroy the virulence of a putrid and virulent fluid?

About nine ounces of the filthy infusion were boiled down for about five hours over a water-bath, the fluid having first been filtered so that it was quite clear to the eye. The residue was then dried and inoculated. On examination of the parts, seventy-two hours afterwards, there was found a collection of yellowish-white matter at the point of inoculation, such as had often previously been noticed in inoculation with various putrid or septic matters. In answer to the second question, *Is the poison soluble in alcohol, or is it precipitated by it?*

The residue, after continued boiling in water, was then boiled with absolute alcohol and filtered. The alcoholic fluid extract was then injected, but of the two experiments one produced a lesion and the other did not. The solid residue or alcoholic precipitate produced the customary symptoms. It was therefore uncertain whether the poison was precipitated by alcohol.

In answering the third question, which may be stated thus, *Does the aqueous extract of the dry alcoholic residue prove poisonous?* it may be said that this matter had been twice boiled in water and once in absolute alcohol. Examination of the thigh at the end of seventy-two hours showed that the same lesion was present as in the case of the unfiltered solution. There was a disseminate collection of the same yellowish-white material, with extensive exudation in the neighborhood, as observed when the matter had "taken."

In answer to the fourth question, *If there are granules in this aqueous extract, will they produce bacteria?* the final experiment was done.

It may be stated that all filtering through anything short of porous clay showed that the fluid contained granules, and in this watery extract of a substance that had been boiled in water and absolute alcohol, and washed with the latter, filtered several times, there still remained bodies of minute size, and in some instances rod-bacteria * in small numbers. To decide whether these minute bodies were capable of breeding bacteria, the "vacuum-tube" experiments were tried.

It may be stated, before going on to this experiment, that it has been definitely ascertained that fluids which are excellent media for bacteria, as Cohn's fluid, for example, will, if boiled a short time and then received into these tubes under certain conditions, not give rise to bacteria—the condition being merely that the tubes have been first superheated, their necks being drawn out and bent down, and then sealed, the air having been in great part expelled. These experiments I have had an opportunity of verifying.

The exact method of performing them was as follows: Glass tubes of about one-third of an inch in diameter were heated in the flame of a gas-lamp until one end was hermetically sealed; the flame was then passed along the tube, gradually heating it to redness, and then it was melted at about three inches from the sealed end; the melting portion was then bent round and drawn out into a fine point. Here, then, if this method was properly conducted, we had superheated the tube, expelled most of the air, and sealed it at both ends. Such is a "vacuum tube." The aqueous fluid, then, to be tested for bacteria, was heated to boiling, and at this temperature the vacuum tubes were immersed deep in the liquid; the delicate extremities were then broken off far below the surface; the fluid immediately rose into the tubes, which were then slowly withdrawn from the vessel, taking care that the delicate nozzle of each was received at the level of the fluid into a pledget of cotton, until each tube was placed in a vertical position, with the nozzle downwards; this latter precaution was designed to avoid the possible contamination of the liquid with the bacteria of the air while the tube was being placed in position. Once, however, in position, it appears to make little difference whether these tubes are exposed directly to the air or have cotton over the mouths of the tubes. In this way eight tubes were filled, four of them being stopped with cotton. As a controlling experiment, that is, to show that bacteria under such conditions will grow, four other tubes were similarly filled with the same liquid—though not, of course, hotter than the temperature of the body—but to which a few drops of bacterial fluid had been added to contaminate it.

Now, this fluid, so contaminated, did not show to the naked eye the characteristic appearance of bacteria, that is, it was not turbid; but we know that if bacteria are going to multiply they will show it by the clear fluid becoming turbid in less than forty-eight hours. This *controlling* experiment seemed to show that bacteria would grow and multiply in this kind of "vacuum tube." Now, as to the question, *Did any such growth take place in the suspected fluid—the watery extract—that proved poisonous?*

At the end of seventy-two hours the fluid in the four contaminated liquids was turbid, and to the microscope was swarming with bacteria in the most active, independent motion.

Of the eight tubes filled with the aqueous extract, but one was at all turbid, and this merely showed a slight film upon the surface. Examined microscopically the clear fluid contained no bodies in motion, but a few motionless and shrivelled rod-bacteria.

It is proper to say here that subsequent examinations showed that of the remaining seven clear tubes several became contaminated, not turbid, but a thin pellicle formed on the surface; but others remained clear when last seen, and as the tubes with the longest necks were the clear ones—length and fineness of the neck being necessary to the experiment—it seems not improbable that some error was committed in manipulation, for it is almost impossible to carry out all the necessary precautions in each case. *It remains, however, as a positive fact,* that some of the tubes did not exhibit bacteria when bacteria would grow naturally under such circumstances. The failures, it is natural to suppose, were such as were to be expected under the conditions.

The following results appear to be authorized by the foregoing experiments:

1. That *putrid matter,* when introduced into the system, is capable of producing a well-marked train of symptoms, which are extraordinarily like those generally known as *sepsis.*

2. That the poisonous quality does not reside in the absolutely clear liquid, when entirely freed from granules.

3. That the poison is sometimes separated by coarse methods of filtration, that is, through common filter paper, though on this point the results were not sufficiently uniform to establish certain conclusions.

4. That continued boiling and evaporation to dryness will not destroy the poison.

5. That continued boiling and evaporation to dryness, and boiling with absolute alcohol, will not destroy the poison.

6. That the dry alcoholic extract, freed of alcohol

* These were doubtless dead, as they cannot survive boiling.

by evaporation with heat, was poisonous. (The liquid alcoholic extract furnished uncertain results.) So far as this experiment may be relied upon to show the albuminous nature of the poison, it is uncertain, for while the alcoholic precipitate (in which, doubtless, the albumen would be) produced poisonous results, it still remains uncertain whether the liquid alcoholic extract was poisonous or not.

7. That of putrid matter which, after several filtrations, was boiled down to dryness, then boiled with absolute alcohol, again dried and extracted with water, the filtrate was poisonous.

8. That this aqueous extract failed in a number of instances to produce bacteria, under circumstances which were favorable to the development of bacteria; and hence the granules, which are the bodies most likely to represent the poisonous principles, appear not to be bacteria or their spores.

I regret that the unavoidable haste with which this paper was completed prevented these latter experiments being carried out with desirable fulness, and that the results, especially with reference to the development of bacteria in these poisonous infusions, can only be regarded as preliminary. If the results in such cases corroborate those just stated, then it would appear that the evidence against bacteria, as the causes of putrid infection, is almost, if not completely, conclusive.

But even if the friends of the germ theory were to find a different state of things—that the vacuum tubes were filled with bacteria—this can give them little satisfaction. For in all such infectious fluids we find granules, or minute microscopic bodies; but since as yet we have reached no method of distinguishing them, we can never be sure that it is not these other bodies that cause the trouble, while their "micrococcal companions" are occupying themselves with rapid multiplication.

And now for the most important general arguments brought forward in favor of the germ theory in its application to various affections.

1. It is said of pyæmia, erysipelas, puerperal fever, and hospital gangrene, and such other diseases as are regarded as septic, that there is a very constant relation between the number of the bacteria present and the intensity of the disease, and that where the changes are most active, bacteria are most numerous.

2. The development and rapid spread of such diseases is most easily explained on the supposition that they are produced by living units rather than by anything else we can conceive of; for it is estimated that the multiplication of bacteria is so rapid that an ordinary bacterium dividing in about one hour, would at the twenty-four hours have originated over 16,000,000 of its kind.

3. No products of the laboratory produce fever, but only such liquids as contain bacteria, or have a fondness for them (Sanderson).

4. The power of retaining active qualities that the poisonous matters show is explainable on the ground of their being bacteria, which have this peculiar property to a wonderful degree, while minute portions of the body, when separated from it, die in a short time.

6. Minute organisms are now generally admitted to be the sole and sufficient causes of diseases, such as scabies, favus, and the like, and our knowledge of various epidemic diseases among plants and animals has led to the general belief that they also are produced by minute organisms.

In reply to these arguments or points in evidence it may be said: 1. That such organisms do unquestionably exist in the diseases referred to, but it is also now known that they occur in health, the entire mucous membrane from the mouth to the anus being often peopled with countless myriads of them in some form or other, and generally in active independent motion. These facts are now generally admitted, as every one who has a good microscope can readily prove for himself.

But it is claimed that bacteria also penetrate the tissues some little distance, at least that they get into the lymphatics from the intestine, which is by no means inconceivable, for it is well known that if persons live continuously in a smoky atmosphere, as in cities where coal is extensively burned, the bronchial glands become the seat of extensive collections of carbon, showing that particles of considerable size can find their way through the lymphatics into the glands.

That bacteria do also get into the general circulation in some of the lower animals is a fact that is now scarcely disputed, and it is further stated by Wagstaffe and others,* that they have seen them in the human blood in health. But that they also are found in other conditions than those of special disease, appears from the fact that they have been found in the pus of acute and chronic abscesses. †

The mere fact that bacteria have a numerical ratio to the intensity of a disease, or its most active changes, may not be anything but a concomitant phenomenon, especially in view of the foregoing facts.

2. In reply to the objection that the multiplication of a contagious matter cannot be compared to anything that is not living, it is said that chemical processes may imitate it, for, according to Bastian,‡ "the crystals of sulphate of soda may multiply when a fragment of such a body is thrown into a complex liquid which contains its component parts, or the liquids of the body acted upon by the original source of contagion may be brought in to contact with the various tissues of the body." It does not appear, however, that we are forced to any such assumption as the former.

3. As for the fact that no product of the laboratory produces fever, it is by no means certain that we shall not find such; we must admit, however, that contagious fluids have a proneness for bacteria.

4. These extraordinary qualities that have been noted are, in a measure at least, possessed by certain vegetable poisons, such as woorara, and certain animal poisons, such as that of the cobra, analyzed by Fahrer, of India, and of the rattlesnake, studied by Weir Mitchell. Fahrer has made most extensive experiments, and found of the poison of the cobra that it may be diluted with water, or even ammonia, or alcohol, without destroying its deadly qualities. After keeping it dried for months it was found also to have retained its virulence; qualities which are extraordinary like those observed in the contagious principles of putrid matter, as already noticed.

5. Bacteria which cannot be distinguished in the experiments cited from those of disease, have been introduced into the system in numbers without producing any lesion whatever.

It seems to be definitely proven, in many instances, that the infecting quality of a substance is not destroyed by continued boiling and absolute alcohol, which are known to destroy the reproductive character of bacteria of definite forms, though it will be admitted that it may require more extended observations to determine whether such influences will prevent the

* Lancet, May 8, 1875.
† Med. Press and Circ., Mar. 10, 1875.
‡ Lancet, April 10, 1875.

Salicylic & Carbolic Acid not disinfectants,

development of bacteria from the very minute bodies that are claimed to originate the definite forms.

One of the most remarkable facts in this connection was observed by Dr. Edward Curtis, while experimenting on the best method of neutralizing or destroying the poisonous action of putrid substances. Both he and I had established, independently, and, as it appeared to us, satisfactorily, that salicylic acid, in the proportion of 1 to 100, with a little phosphate of soda as a solvent, and carbolic acid of the same strength, have, each of them, the power of preventing the formation of bacteria for a period of two months * at least. This known anti-microphytic power of salicylic acid was then utilized to determine if it would also prevent infection if mixed in a concentrated form with such poisonous matters as tongue-scrapings. It was found, extraordinary as it may appear, not to have any effect upon the poisonous quality of the matter, and the lesions, though without bacteria, appeared as usual.

These experiments I believe to have been the first that reached this result in regard to salicylic acid. They were carried out in a somewhat different way by Dougall,† of Scotland, as reported in July last, subsequent to Dr. Curtis's experiment. Dougall found that while carbolic acid in concentrated solutions prevented the development of ordinary bacteria, it under certain conditions suspended, but failed to destroy, the virulent properties of vaccine virus.‡

In the matter of salicylic acid, confirmation of these results has been obtained from Von Gulik, § of Germany; for after many experiments with lymph virus, which, kept in capillary tubes, only lasted with him from fourteen days to a month, it was successfully preserved by him in glycerine about two months, but not more, though salicylic acid kept it over a year.

These experiments, though done with a different view, singularly suggest that these remarkable substances—salicylic acid and carbolic acid—while excellent *preservatives* and *anti-microphytics*, are perhaps not *disinfectants* at all in the strict sense of the term.

Let us now briefly review this question in its relation to a few special diseases, which have been recently investigated with the aid of the most recent modern appliances by scientific experts whose opinions are in every way worthy of respect. I refer to anthrax, or the carbuncular diseases of the French, sheep-pox, small-pox, relapsing fever and typhoid.

The name carbuncular diseases, as applied by the French veterinary surgeons, includes a remarkable class of contagious affections, not very clearly limited, but including such forms as anthrax or malignant pustule, splenic fever, and mycosis intestinalis. All these affections show post-mortem appearances that are extraordinarily similar. Balls of round spheroids are said to be found in the diseased tissues, and rod-shaped bodies in the circulating blood, particularly in the portal vein; the spleen is enlarged, there are hemorrhagic infarctions of the intestines causing the mucous membrane to slough off, extensive serous exudations and infiltrations, and hyperæmic enlargement of the glands in the neighborhood of the affected parts. The appearance of a pustule (malignant pustule) appears to be common in these cases, but is not a constant appearance; all these symptoms often leading to a fatal termination, though the pustule be absent.

It is in these diseases that Davaine called attention to the presence of minute rods,* which he called bacteridia. He said that they preceded the morbid symptoms, and when the bacteridia of decomposition appeared the contagiousness of the blood ceased. They were so numerous, according to this author, that it was estimated from eight to ten millions existed in a single drop of blood, and he claimed that he had produced the disease by the inoculation of the millionth dilution of such a drop.

But he was met by a number of opponents, among them Bouley,† Gaillard, and others, who contended that the rods were very often absent, and yet the blood without them had infecting qualities. This, with our present knowledge, is not difficult to explain, especially as he gives no special distinguishing marks to separate them from ordinary rod-bacteria, and we know that they may exist in health, especially in the blood of the lower animals. Bollinger himself, an excellent authority, while favoring the view that the disease is due to minute organisms, admits that he has inoculated animals successfully with fluids that did not contain the rods, and he cites Branell to the same effect; Bouley, Leplat, and others also agree on this point. But Bollinger tells us that the infecting fluid always contains spherical bacteria, that is, such minute bodies as by cultivation might produce rods.

This brings us to a point that we have reached in regard to putrid infection. It is clear that the infecting matter is not necessarily in the rods, but *is it in granules which subsequently produce rods?* Let us, however, first glance at small-pox, sheep-pox, and vaccine.

There is probably no subject that has been more closely inquired into by a large number of observers than the contagious principle of these diseases, and it appears to be likely that the alleged forms are the same in all. Some ten years ago it was noticed that vaccine lymph contained minute spheroids, accounts of which were published in 1867–1868,‡ and to which Cohn gave the name *microsphæræ vaccinæ*.

Their multiplication in the field of the microscope and their chemical properties led them to be regarded as the *micrococcus*. They were found in the early stage of the disease, before the eruption, and hence were thought to have some causal relation with it. Chauveau attempted to separate them from the lymph, and he appears to have shown by his experiments that the virulent principle is both *insoluble* and *non-diffusible*. Sanderson, who followed out Chauveau's researches, while he comes to the conclusion that the matters are insoluble, says that he has found them "filamentous, not jointed, but branching and giving off from their extremities microspheres or conidia, much after the fashion of the penicillium."§ Cohn found them as small, colorless cells, sometimes in rosary-like chains of eight or more links, and sometimes in heaps.

The weak point in all this evidence, however, is that no sufficient line of distinction is drawn between these bodies and others that would exactly correspond to this description, and that are found in other matters,—an argument which is applicable to the whole doctrine of bacteria in relation to disease.

Relapsing fever is one of the strongholds of those who maintain the microphytic theory of disease. In 1872 Obermeier, of Berlin, published a list of thirty-two cases in which he had observed that the blood was constantly the abode of long filamentous bodies called *spirilla*. They appeared during the rise of the fever,

* At the end of eleven weeks the fluid was still free from bacteria.

† Dougall, Glasgow Med. Journ., July, 1875. Sanitarian, Sept., 1875.

‡ Maclagan had, however, previously shown this. Lancet, April 24, 1875. p. 576.

§ Allg. Med. Central Ztg., 76, 1875.

* Pollender had described them several years previously.

† Cyclop. ed. of Pract. Med., Vol. iii., p. 377

‡ Virchow's Archiv, 41, 42, 1867–1868.

§ Loc. cit.

SOLUBILITY OF SALICYLIC ACID (J. Müller: *Berlin. Klin. Wochens.*, 1875, No. 19).—Salicylic acid is soluble in three hundred parts of water, in four parts of alcohol, in fifty parts of hot oil, and in the same proportion of hot glycerin, without precipitation on cooling. Glycerin aids its solution in water, so that this will take up one part to three hundred, provided the acid is first dissolved in twenty parts of hot glycerin, and this mixed with eighty parts of water.

Dr Boyland [illegible] Baltimore, beg[illegible]
with Prof Kolbe in Leipzig under [illegible] and
was [illegible], made a mark of exp. with it.

would like to ask a question. Why is it that, dubbed *soldier*, the average Anglo-Saxon American willingly bestows upon the government for a mere pittance an amount of intelligent work and sterling integrity which in civil life would bring a rich reward,—ay, and does not even begrudge life itself, —whilst the same Anglo-Saxon, yclept *politician*,

Progress of Medical Science.

THYMOL AN ANTISEPTIC AND ANTIFERMENTATIVE SUBSTANCE.—At the suggestion of Prof. Liebreich, Lewin has investigated the properties of thymol, and has published a part of the results at which he arrived. He states that this substance, the formula of which is $C_{10} H_{14} C_2$, is a benzol obtained by distillation from the oil of thyme, and consists of highly aromatic white crystals soluble in 1000 parts of hot water. A solution even as weak as this exhibits all its peculiar properties. He found that saccharine fermentation was wholly prevented by a $\frac{1}{10}$ per cent. solution of thymol, while solutions of carbolic and salicylic acid four times as strong were not nearly so efficacious. The thymol solution also at once arrested a fermentation which had already begun. The quantitative determination of the loss of weight by the process of fermentation gave even more striking results. He found that milk treated with the thymol solution did not coagulate till twenty days later than when mixed with the same quantity of simple water, while it remains perfectly sweet and free from mould at the end of five weeks. The same was the case with white of egg after eleven weeks. Putrid pus, when mixed with the thymol solution, lost its fetid smell, and remained in this condition until it dried up. Urine similarly treated did not on an average show signs of decomposition till the end of five weeks. He declares, moreover, that thymol is capable of arresting or preventing the action of putrid pus upon the animal system, and is decidedly deodorizing. The high price of the article he regards as of minor importance, because it may be used in such dilute solutions. When taken into the mouth a $\frac{1}{10}$ per cent. solution caused a slightly burning and astringent sensation. When taken into the stomach it appeared to prevent fermentative changes, but not to interfere with digestion.—*Centralblatt f. d. med. Wissensch.*, May 1, 1875.

recoveries in the painful stage of the affection, follow fracture of a limb, compelling the patient to a season of quiet in bed.

Epidemic Thoracic Catarrh.—This name Finsen has given to an epidemic thoracic affection peculiar to arctic regions, and especially Iceland. Of the 155 cases observed by him in the latter country, 72 were of the catarrhal form, 42 pneumonic, and 41 pleuritic. Two such epidemics were observed: the first lasting from the fall of 1859 to the end of 1860, spreading from the eastern portion of the northern district over the whole country, and terminating in the eastern district. The second, on the contrary, commenced in the eastern district, and spread in a westerly direction over the entire country, terminating in the winter of 1863. These epidemics were peculiar in a pathological regard, not only because of the marked contagious nature of the catarrh, but also because of the remarkable fact, that one and the same epidemic consisted of such varied forms of disease as catarrh, pneumonia, and pleurisy, and that the last two inflammatory diseases should be contagious. He thinks that there could be no suspicion of a mistake in the diagnosis, for similar epidemics also occur in Greenland.

The "snuffles" epidemic of Greenland also consists of catarrh, pneumonia, and pleurisy, but it occurs regularly every year at the same season, and spreads over the country with a strong developed contagiousness, passing from north to south, and later in the year with a retrograde movement, from south to north. It is of a more dangerous character, however, than the Iceland epidemic—a very considerable portion of the cases terminating fatally.

Epidemics of influenza are of more frequent occurrence, and from their wide extent play a more important rôle than in Europe. The author passed through three such, which did not present any peculiarity other than their great intensity. In one of them 2.37 per cent. of the population of his district perished. The greatest proportion of fatal cases occur in early childhood, before the fifth year, and are also frequent after

26.25. Other foreign cities at most recent dates, per 1,000: Paris, 30; Rome, 36; Vienna, 29; Brussels, 26; Berlin, 24; Hamburg, 24; Calcutta, 42; Bombay, 29; Madras, 36; Amsterdam, 27; Rotterdam, 29; The Hague, 26; Christiana, 35; Breslau, 26; Buda Pesth, 43; Turin, 29; Alexandria, 41; Copenhagen, 27; Munich, 33; Naples, 39.

Carbolic Acid?—In September last, a meeting of Physicians in New Orleans* was called to discuss the question of the use of Carbolic Acid by the Board of Health, comprehending the following points: 1. Is carbolic acid a disinfectant? 2. Is it an antiseptic? 3. Is it a poison? 4. Is it possible to disinfect the atmosphere of a whole city by *carbolic* acid or other means?—After a good deal of discussion a committee was appointed, which subsequently submitted the following report, which was adopted, that:

1st—Carbolic acid as used for purpose of "disinfection" by the Board of Health in New Orleans during the years 1867, '70, '71, '72, '73, '74 and '75, has failed to arrest small-pox, scarlet fever and yellow fever.

2d—It has, in several instances, proved injurious to the inhabitants of the *"disinfected"* districts.

3d—The facts observed in New Orleans during the practice of carbolic acid "disinfection" upon a larger scale than ever before practiced in the history of sanitary science, sustain the view held by high authorities that it is impossible to disinfect the atmosphere of an entire city, or even a circumscribed area, as of two or more squares. Cases of yellow fever have occurred in succession, at long intervals, in houses and localities which have been most thoroughly subjected to the so-called "carbolic acid disinfection." Instances have been observed where unacclimated individuals returning from the country before cold weather had put an end to the disease, and entering those districts of the city in which carbolic acid had been most lavishly employed as a "disinfectant," have been attacked by yellow fever.

4th—Yellow fever has followed its usual course. . . . No connection has been traced between the decline and cessation of the disease and the amount of carbolic acid used for purposes of disinfection.

5th—The absence of epidemics (1871, '72, '73, '74 and '75) is believed to be due, not to carbolic acid disinfection, but to other and usual causes.

*New Orleans *Medical and Surgical Journal*, November, 1875.

Ferry-Boat Ventilation.—The patrons of the greatest thoroughfare in the world—the ferry between New York and Brooklyn—are to be congratulated on the adoption of means of ventilation. The plan is admirable alike for its simplicity and efficiency, and the wonder is that it has been so long delayed. It consists of a self-acting exhaust current by means of a box over each cabin with swinging doors at the ends; the motion of the boat either way serves to close the forward door and so prevent a draught, while by the same motion of the boat the foul air in the cabins is given a counter current, and rising, forces open the rear door and escapes. The same arrangement is equally applicable to the city railroad cars, and should be required by the health authorities.

Analytical and Food Department.

The Lactometer.—In the Court of Special Sessions, New York, February 2d:—Several milk dealers were tried for selling adulterated milk. Judges Bixby, Wandell and Duffey sat. John Schneider was bound over and Francis McCannon was discharged. In the case of John Juechter, of 98 Mott street, Prof. C. F. Chandler was called, and testified: I am President of the Board of Health. I have made milk a subject of special study since I became President of the Board of

Health; after many experiments I have decided that the lactometer is an effectual instrument for detection of impure milk; the lactometer and hydrometer are about the same, with the difference, perhaps, that the the latter is not graduated for milk; these lactometers were made under my order, were brought to me for inspection, and I gave them out to the police milk inspectors.

Prof. Henry Morton (Penn. Coll. of Chemistry), testified: The lactometer is highly reliable, and can be made to give results as accurate as can be obtained by any method; it will undoubtedly give the specific gravity of milk accurately; if the milk shows a specific gravity of 88 degrees on the lactometer, the milk has been adulterated; every precaution must be taken in testing milk that the instrument be properly adjusted.

Prof. G. F. Barker, formerly of Yale Coll., testified: The question of milk has occupied my attention for some months past; analysis is the safest and surest method to test the purity of milk; the lactometer simply determines the specific gravity of the milk; pure, rich milk shows a lesser gravity than skim milk, which may induce the inspector to believe that it is adulterated, condemn it, and arrest the vender.

Dr. G. C. Cauldwell, of Cornell University, testified: I am what is called an expert in chemistry; I have made a number of tests of milk fresh from the cow, and have arrived at the conclusion that no instrument exists that is as effectual for the detection of adulteration in milk as the lactometer.

Dr. Endemann (Chief of Disinfecting Corps, Health Department), testified: As far as adulteration of milk by water is concerned, the lactometer is a reliable instrument, but further than that I have little faith in it; if a sample of milk stands below 100 degrees it cannot be pure.

Officer Jepson, Milk Inspector, sworn: I receive my instructions from the Board of Health; the President explained the use of the lactometer to me; I have tested 1,009 cases of milk during the past year, and consider 102 degrees the standard.

Elwyn Waller, sworn: I am the Assistant Chemist in the School of Mines of Columbia College, under Dr. Chandler; have made many experiments in milk, and think the lactometer adopted by the Board of Health highly reliable—that is, as regards adulteration by water; should the lactometer stand at 88 degrees, I would suppose something lighter than milk had been added, probably water; I have, during the past few weeks, had over fifty cases of milk sent me for analysis; I analyzed the milk taken from the prisoners' cans, and found 84 parts milk, the remaining 16 parts water; last September I visited over one hundred cows in Orange County; the lowest test of milk taken from them was 102 degrees; I tested different breeds, and found the Alderneys were lower than the others.

The Prisoner took the Stand and Testified: "I got this milk from the man what I don't know, because I don't reside auf dot place; der lagdom—lag—dot—tam ting, I can't call his name, say my milk weighed 88 degrees; all right; I never was heard dot der milk was wasser; how could I tell your three honors, where I buys gream for mine family; never I dried der milk; der officer said he tolt me once before; dot aint was so; I bought one of dose dings made of glass, unt don't know to use him; Shudge, I was a honest man, I was, unt don't could understand the meanings of dese fellers very well."

"Very well, John," said Judge Bixby, "I find you guilty and fine you $100."

"Allright, Shudge; I don't cry over a little spilt milk. Here was the hundret tollar." And handing ten X's over to the clerk, the prisoner marched smilingly away, remarking as he closed the gate, "Py tam, I sells no more milk."

End of 4th Lecture 1872.

Here took up my M.S. notes, 1872.

and promotes combination. It absorbs oxygen which decomposes organic matter.

EARTH.

Earth is good.

PROTO-SULPHATE OF IRON.

Proto-sulphate of iron, also.

NITRATE OF LEAD.

Nitrate of Lead is good for sulphuretted hydrogen. It has no odor, and is very powerful, but has no effect on other gases.

DOUBLE ACTION OF CHLORINE.

Chlorine does more. Its action is double. It combines with hydrogen and sets oxygen free to act on the organic matter.

NITROUS AND SULPHUROUS ACIDS.

Nitrous acid (made by pouring nitric acid on copper) is good.

Sulphurous acid also. These two cannot be used much, as during their action everybody has to leave the room.

CARBOLIC ACID.

Carbolic (or phenic) acid is a recent disinfectant. It is expensive and has a disagreeable odor worse than creosote.

IODINE.

Iodine is a potent disinfectant.

Nov 2nd 1868

Hygiene of Habitations.

HYGIENE OF HABITATIONS.

1. Site, dry & not malarious.
2. Enough Sunshine, without glare.
3. Abundant Ventilation.
4. Good Water-supply.
5. Drainage, & sewage removal.
6. Proper construction of the building for dryness, of walls, roof, & foundation.
7. Heat, during cold weather.

End of 16th Lecture, 1868.

National Board of Health

BULLETIN.

VOL. 1.] WASHINGTON, D. C., SATURDAY, JANUARY 17, 1880. [No. 29.

DISINFECTANTS.

Experiments designed to test the value of certain gaseous and volatile disinfectants, by George W. Sternberg, Surgeon U. S. A.

The following experiments, designed to test the value of some of the most commonly used disinfectants, were commenced by the writer in 1876. They are now resumed by direction of the National Board of Health, and the results will be reported from time to time:

When disinfection is practiced in ships, dwellings, and hospitals, for the purpose of destroying the virus of some infectious disease, other measures are commonly resorted to as well, such as ventilating, scrubbing, whitewashing, and painting, so that the result, if successful so far as the non-occurrence of subsequent cases of the disease is concerned, cannot fairly be attributed to the action of the disinfectant employed; and it is difficult to determine what share, if any, the so-called disinfection has had in the accomplishment of this result. It is well known to sanitarians that methods of disinfection have often enjoyed the confidence of the public, and even of accomplished physicians, which are demonstrably inefficient, and consequently harmful, as giving false confidence and supplanting other and really efficient methods. As examples of this, may be mentioned the chlorine saucers which it was formerly the fashion to place under the beds in hospital wards and the piece of flannel saturated with a few drams of carbolic acid, which is still frequently hung up in the sick-room by order of the "doctor." No one will deny that chlorine and carbolic acid are, under certain circumstances, and in certain quantity, valuable disinfectants. The protest made here is against their use in demonstrably insufficient quantity with the unjustifiable assumption on the part of physicians and their patients that disinfection has been practiced, and that responsibility as to the occurrence of subsequent cases of the disease is at an end after such disinfection.

It is evident, then, that those disinfectants which enjoy the most reputation should be tested by some method other than their use in the sick-room, and that, if possible, exact data should be obtained to serve as a guide in their employment.

The main difficulty in such an undertaking is to obtain a test which will be accepted as satisfactory. The power to destroy the vitality of bacteria is a test of value, as indicating the arrest of putrefactive processes, but, in the present state of science, cannot be accepted as proving a power to destroy the specific poisons of the infectious diseases. It has been used in some of the following experiments and will be used in future for a comparison of results with those obtained from other tests believed to be more trustworthy. These tests depend upon the power of the disinfecting agent to destroy the potency of vaccine virus as shown by vaccination, and of the septic poison as shown by inoculation experiments.

It may probably be safely assumed that the infectious material of small-pox would be destroyed, so far as its specific action upon man is concerned, by any substance which is capable of neutralizing the potency of vaccine virus, if it be subjected to the action of the particular disinfectant used under the same conditions as to temperature, moisture, quantity of disinfectant, amount and physical condition of virus (wet or dry, in powder or in masses, &c). The inference may not be justified that what destroys the infectious material of small-pox will destroy the specific poison of the other infectious diseases, but there is at least a strong probability in its favor and no better test can perhaps be found.

The apparatus used in the following experiments is a simple air-chamber, having a capacity of 646 cubic inches, 18.62 pints, or 10.58 litres, and intended to represent the apartment to be disinfected. This air-chamber is provided with a close-fitting door to permit the introduction of the vaccine virus, &c., and has openings, closed by corks, for the introduction of gases. The top and sides are of glass, and the glass top has a perforation closed by a valve upon the inside of the box, but operated from the outside.

This is for the purpose of permitting experiments upon bacteria, &c., without opening the air-chamber, into which a given percentage of some disinfectant has been introduced. To accomplish this a watch-glass containing a drop of the fluid to be experimented upon (*e. g.*, putrefying meat-juice filled with bacteria) is inverted over this opening and the valve is opened, thus exposing the concave surface of the watch-glass to the atmosphere of the interior of the box. A microscope, mounted upon the air-chamber as a stand, permits the observation of bacteria upon the inverted watch-glass while exposed to the disinfectant.

Experiment 1. Drop of water containing actively moving bacteria exposed over aperture in top of air-chamber, on inverted watch-glass; one sulphur-match burned in air-chamber; all movements of bacteria had ceased at end of five minutes; watch-glass removed from over aperture; no movement four hours later.

Experiment 2. A similar drop exposed for two minutes. All movement had ceased at expiration of this time; a few bacteria moving at the end of four hours.

Experiment 3. A similar drop exposed for one minute. Bacteria still active; four hours later still active. Exposed again for four minutes to SO_2 produced by burning half a match (split) in air-chamber; all motion had ceased at expiration of this time.

Experiment 4. A similar drop exposed to SO_2, produced by burning one grain sulphur in air-chamber; all motion arrested in one minute.

Experiment 5. The same, burning one-eighth grain sulphur in air-chamber; all motion arrested in six minutes.

Experiment 6. Drop of infusion of meat containing innumerable active bacteria *(b. termo)* exposed on inverted watch-glass over aperture in air-chamber; one-fourth grain of sulphur burned; motion ceased in eight minutes.

Experiment 7. The same repeated, burning one grain of sulphur in air-chamber. Motion ceased in two minutes. Experiments 8 and 9, same repeated with same result.

Experiment 10. The same, with one-half grain sulphur burned in air-chamber. Motion ceased in two minutes.

Experiment 11. Same, with same result.

Experiment 12. One fluid dram of pure carbolic acid in watch-glass placed on floor of air-chamber. Drop of fluid containing bacteria exposed on inverted watch-glass over aperture. Bacteria still active at end of twenty minutes.

Experiment 13. Drop of vegetable infusion containing bacteria exposed to fumes of carbolic acid from a rag suspended in air-chamber. Amount used, eight drops impure acid. Motion ceased in twenty minutes.

Experiment 14. One drop of pure carbolic acid placed within one-eighth of an inch of drop of water containing bacteria in watch-glass, which was inverted on glass top of air-chamber (aperture closed). Motion of bacteria ceased in five minutes.

Experiment 15. Liquor ammoniæ in watch-glass placed on floor of air-chamber. Drop of water containing bacteria exposed over aperture. All movement ceased in three minutes.

Experiment 16. Bacteria in drop of putrefying meat infusion exposed over aperture, with one ounce chloride of lime in saucer on floor of air chamber. Bacteria still active at end of thirty minutes.

Experiment 17. Watch-glass filled with infusion of meat swarming with bacteria of putrefaction placed in air-chamber, the watch-glass resting upon one ounce of chloride of lime in a saucer. Bacteria still active at end of thirty minutes. At end of one hour movement sluggish. In one hour and thirty minutes all movement had ceased.

Experiment 18. Above repeated with same result.

Experiment 19. Drop containing bacteria exposed to fumes of five drops of impure carbolic acid from rag suspended in air-chamber; equal to forty-six fluid ounces in a room twelve feet square and twelve high. Movement ceased at end of one hour.

Experiment 20. Above repeated. Motion ceased at end of thirty minutes. (Smaller drop and more time allowed for volatilization of carbolic acid.)

Experiment 21. Above experiment repeated with same result; motion ceased in about thirty minutes.

Experiment 22. Experiment repeated with three drops of impure acid; motion ceased in one hour and ten minutes.

Experiment 23. Vaccine virus, quite fresh, rubbed up with glycerine and divided into two portions: One portion exposed for twelve hours to SO_2, produced by burning one-fourth grain of sulphur in air chamber; three children vaccinated on the following day with this virus, also with the virus not exposed to sulphurous acid gas. *Result:* Examined children on seventh day, and found in each case a characteristic vesicle from the insertion of virus not exposed to SO_2, and a completely negative result from virus exposed in air-chamber.

Experiment 24. Fresh vaccine virus, rubbed up with glycerine and

divided into two portions: One portion placed in air-chamber for twelve hours, exposed to fumes of five drops of carbolic acid volatilized from a rag suspended in air-chamber; five children vaccinated the following day, each from both portions of virus in two different places. *Result:* Examination on seventh day showed eight characteristic vesicles from the ten insertions; one failure from carbolized virus, and one from non-carbolized.

Remark. These experiments upon vaccine virus are now being continued, with the kind assistance of Dr. Smith Townshend, health-officer of the District of Columbia.

Report of mortality in cities of the United States for the week ending January 3, 1880.

CITIES IN WHICH BURIAL PERMITS ARE REQUIRED.

States and cities.	Population.	Deaths under 5 years.	Total number of deaths.	Annual death-rate per 1,000.	Cerebro-spinal fever.	Consumption.	Diarrhœal diseases.	Diphtheria and croup.	Erysipelas.	Lung diseases, acute.	Malarial fevers.	Measles.	Puerperal diseases.	Scarlet fever.	Small-pox.	Typhus and typhoid fevers.	Whooping-cough.	Yellow fever.
Me....Bangor	20,000	1	6	15.6	.....	1	.....	1	.....	.....	.....	.....	.....	.....	.....	1	.....	.....
N. H...Concord	14,000	.....	6	22.3	.....	2	.....	.....	.....	2	.....	.....	.....	.....	.....	.....	.....	.....
Mass ..Boston	375,000	49	137	19.0	.....	26	1	10	3	23	.....	.....	.....	2	.....	6	2	.....
Cambridge	50,000	8	21	21.9	.....	2	.....	3	.....	3	.....	.....	.....	.....	.....	.....	.....	.....
New Bedford	27,000	5	13	25.1	.....	.....	1	1	.....	.....	.....	.....	.....	1	.....	.....	.....	.....
Newburyport	13,800	2	9	33.4	.....	2	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....
Marblehead	7,500	4	7	48.7	.....	.....	.....	5	.....	1	.....	.....	.....	.....	.....	.....	.....	.....
Fall River	48,500	.....	25	26.9	.....	4	1	1	.....	.....	.....	.....	.....	5	.....	.....	.....	.....
Plymouth	6,334	2	3	24.7	.....	.....	.....	.....	.....	2	.....	.....	.....	.....	.....	.....	.....	.....
Lawrence	40,000	4	13	16.9	.....	3	.....	1	.....	.....	.....	.....	.....	.....	.....	1	.....	.....
Brockton	12,000	2	6	26.0	.....	1	.....	1	.....	1	.....	.....	.....	.....	.....	1	.....	.....
Pittsfield	.....	.....	5	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Milford	10,000	.....	2	10.4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Somerville	23,000	.....	5	11.3	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Springfield	31,000	1	5	8.4	.....	2	.....	1	.....	1	.....	.....	1	.....	.....	.....	.....	.....
R. I....Providence	101,500	15	52	26.7	.....	6	.....	2	.....	9	.....	.....	2	12	.....	1	.....	.....
Conn ..New Haven	60,000	5	1	8.7	.....	2	.....	1	.....	1	.....	.....	.....	.....	.....	.....	.....	.....
Vt.....Burlington	16,500	1	1	3.2	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....
N. Y...New York*	1,097,563	196	508	24.1	2	88	9	16	3	101	3	12	4	6	.....	4	9	.....
Brooklyn	564,448	92	222	20.5	.....	33	33	2	.....	46	3	3	7	6	.....	2	.....	.....
Yonkers	19,000	1	3	8.2	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....
Poughkeepsie	20,000	2	5	13.0	1	1	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....
Newburgh	17,568	2	6	17.8	.....	1	.....	.....	.....	3	.....	.....	.....	.....	.....	.....	.....	.....
Sing Sing	5,000	.....	4	41.7	.....	2	1	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....
Utica	35,000	10	27	40.2	.....	4	.....	.....	.....	1	1	.....	.....	.....	.....	.....	.....	.....
Rochester	90,000	10	31	17.9	.....	6	1	2	.....	1	.....	.....	.....	3	.....	.....	.....	.....
Binghamton	18,000	.....	3	8.7	.....	.....	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
N. J...Hudson County	199,000	42	84	22.0	.....	9	.....	5	.....	12	1	.....	.....	7	.....	1	.....	.....
Newark	125,000	20	46	19.2	.....	7	2	1	.....	9	2	.....	.....	1	.....	1	.....	.....
Paterson	40,000	.....	25	32.6	1	7	1	.....	.....	4	.....	.....	2	2	.....	1	.....	.....
Penn ..Philadelphia	901,380	102	317	18.3	1	45	3	18	.....	19	.....	2	1	3	3	13	.....	.....
Erie	30,000	3	9	15.6	.....	1	.....	.....	.....	2	.....	.....	.....	.....	.....	.....	.....	.....
Reading	40,110	7	11	14.3	.....	2	.....	1	.....	2	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh	145,000	24	63	22.6	.....	5	3	11	.....	7	.....	.....	.....	5	.....	2	2	.....
Del....Wilmington	44,000	3	11	13.0	.....	2	.....	1	.....	.....	1	.....	.....	2	.....	.....	.....	.....
Md ....Baltimore*	400,000	48	137	17.8	.....	27	2	15	.....	10	.....	.....	1	15	.....	2	1	.....
District of Columbia*	170,000	32	85	26.1	.....	13	1	1	.....	13	3	.....	1	.....	3	1	1	.....
Va.....Norfolk*	24,000	5	18	39.1	.....	2	2	.....	.....	4	1	.....	.....	.....	.....	.....	.....	.....
Richmond*	80,000	7	26	16.9	.....	4	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....
S. C....Charleston*	57,000	12	38	34.8	.....	9	.....	3	1	3	.....	.....	.....	.....	.....	2	.....	.....
Ga.....Savannah*	32,656	5	17	27.1	.....	2	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	1	.....
Atlanta*	41,548	3	7	8.8	.....	1	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....
Fla ... Jacksonville	10,000	1	3	15.6	.....	1	1	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....
Ala....Mobile	40,000	5	14	18.2	.....	2	1	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....
Miss...Vicksburg	15,000	2	5	17.3	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....
Columbus	5,300	.....	1	9.8	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
La.....New Orleans*	210,000	36	110	27.3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Shreveport	7,060	1	2	14.9	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ark....Little Rock	22,000	1	4	9.5	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Tenn ..Nashville*	27,085	7	18	34.6	.....	2	1	.....	1	5	.....	.....	.....	.....	.....	3	.....	.....
Ohio...Cincinnati	280,000	38	102	19.0	.....	13	2	4	1	13	.....	.....	.....	6	.....	6	.....	.....
Cleveland	175,000	23	54	16.1	.....	6	.....	10	2	5	.....	.....	1	5	.....	2	.....	.....
Dayton	39,000	7	18	24.1	.....	1	.....	3	.....	2	.....	.....	.....	1	.....	.....	.....	.....
Gallipolis	5,500	.....	1	9.5	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Mich...Port Huron	8,190	1	1	6.4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Ind ....Evansville	37,500	2	9	12.5	1	.....	.....	1	.....	1	.....	.....	.....	1	.....	.....	.....	.....
Indianapolis	97,000	11	24	12.9	.....	2	.....	.....	.....	4	1	.....	.....	4	.....	1	.....	.....
Ill.....Chicago	537,624	80	159	15.4	.....	21	.....	34	.....	17	1	6	2	8	.....	4	.....	.....
Peoria	40,000	3	7	9.1	.....	1	.....	1	.....	1	.....	.....	.....	2	.....	1	.....	.....
Quincy	35,000	3	9	13.4	.....	2	.....	.....	.....	1	.....	.....	.....	.....	.....	2	.....	.....
Wis....Milwaukee	124,000	15	38	16.0	1	6	.....	4	1	2	.....	.....	1	.....	.....	1	.....	.....
Minn ..St. Paul	51,080	3	8	8.1	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Iowa...Burlington	30,000	2	7	12.2	.....	.....	1	.....	.....	1	.....	.....	.....	1	.....	.....	.....	.....
Dubuque	30,000	1	5	8.7	.....	.....	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Keokuk	15,000	3	3	10.4	.....	.....	.....	.....	.....	.....	.....	.....	.....	2	.....	.....	.....	.....
Mo ....Saint Louis	500,000	35	110	11.5	3	13	2	5	1	8	.....	1	2	.....	.....	2	.....	.....
Kansas City	61,000	3	13	11.1	.....	.....	.....	3	.....	6	3	.....	.....	.....	.....	.....	.....	.....
Nebr. ..Omaha	30,000	1	2	3.5	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....
Cal ....San Francisco	300,000	23	89	15.5	.....	14	2	3	.....	17	.....	.....	.....	.....	.....	2	.....	.....
Vallejo	5,000	.....	2	20.8	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....
Totals	7,789,686	1,032	2,847	19.0	10	412	72	176	14	373	21	24	25	100	6	64	16	

* Baltimore has 343,715 white, 56,285 colored; deaths, 106 white, 31 colored. Rate per 1,000 white, 15.9; colored, 28.4. District of Columbia has 114,000 white, 56,000 colored; deaths, 48 white, 37 colored. Rate per 1,000, white, 21.9, colored, 34.5. Norfolk has 14,087 white, 9,913 colored; deaths, 10 white, 8 colored. Rate per 1,000, white, 37.0, colored, 42.1. Richmond has 46,000 white, 34,000 colored; deaths, 8 white, 18 colored. Rate per 1,000 white, 9 1, colored, 27.6. Charleston has 25,000 white, 32,000 colored; deaths, 13 white, 25 colored. Rate per 1,000, white, 27.1, colored, 40.7. Savannah has 17,493 white, 15,163 colored; deaths, 3 white, 14 colored. Rate per 1,000, white, 8.9, colored, 48.1. Atlanta has 25,373 white, 16,175 colored; deaths, 3 white, 4 colored. Rate per 1,000, white, 6.1, colored, 12.9. New Orleans has 155,000 white, 55,000 colored; deaths, 76 white, 34 colored. Rate per 1,000, white, 25.6, colored, 32.2. Nashville has 17,585 white, 9,500 colored; deaths, 8 white, 10 colored. Rate per 1,000, white, 23.7, colored, 54.9.

The following reports, for the week ending January 3, are from places requiring burial permits and having less than 5,000 population:

Edgartown, Mass., population 1,700; two deaths from old age. Murfreesboro', Tenn., 4,000; one death, under 5 years. Nantucket, Mass., 3,000; two deaths; old age 1, cancer 1. Shelbyville, Tenn., 2,000; one death from peritonitis. Total population, 10,700; total deaths, 6; under 5 years, 1; rate per 1,000, 29.2.

The following reports, for the week ending January 3, are from places in which burial permits are not required:

Allegheny, Pa., population 75,000; deaths, 16; under 5 years, 6; croup 1, typhoid fever 1. Bath, Me., 10,000; deaths, 3; typhoid fever 1. Battle Creek, Mich., 7,500; deaths, 2. Bridgeton, N. J., 8,000; no deaths. Calais, Me., 7,000; consumption 1, pneumonia 1. Carrollton, Miss., 600; no deaths. Clinton, Mich., 1,000; no deaths. Columbus, Ga., 10,000; deaths, 4; consumption 2. Crystal Springs, Miss., 1,000; one death. Fayette, Miss., 300; no deaths. Gunn City, Mo., 125; consumption 1. Indianola, Tex., 900; no deaths. Iuka, Miss., 1,000; no deaths. Madison, Ind., 12,000; deaths, 4; under 5 years, 2; croup 1, pneumonia 1. Mansfield, Ohio, 11,000; deaths, 2; under 5 years, 1. Mount Pleasant, Iowa, 5,000; two deaths. Niles, Mich., 4,630; pneumonia 1. Painesville, Ohio, 5,000; deaths, 2; malarial fever 1. Ripley, Miss., 1,000; no deaths. Starkville, Miss., 1,163; no deaths. Tuscaloosa, Ala., 4,000; deaths, 2; typhoid fever 1. Waterbury, Conn., 16,000; deaths, 4; under 5 years, 1. Wesson, Miss., 2,000; no deaths. Winona, Minn., 11,786; two deaths. Youngstown, Ohio, 17,000; deaths, 2; typhoid fever, 2. Louisiana, Mo., 5,000; no deaths. Total population, 218,204; total deaths, 51; under 5 years, 10.

WEEKLY SUMMARY OF MORTALITY.

The reports for the week ending January 3 represent a total population of 7,789,686; the number of deaths being 2,847, the annual rate of mortality is 19.0 per 1,000, having been 17.9 the week previous. With this increase in the general death-rate the mortality under 5 years has relatively decreased, being now 36.3, as compared with 38.3 per cent. for last week. No marked change has occurred in the distribution of zymotic diseases, and *scarlet fever* is the only one now increasing. The eastern cities, from Providence to Baltimore, both included, report more than half of the deaths from this disease, the two cities named giving 27 out of the 100 deaths. Most of the remainder occurred in Pennsylvania, Ohio, and Illinois. *Measles* are limited, as before, almost entirely to two centers, New York and Brooklyn, and Chicago; these cities report 21 of the 24 deaths. *Diphtheria and croup* have decreased from 6.63 to 6.18 per cent. of the total mortality, and are still reported chiefly from the cities north of the Potomac and Ohio Rivers, and from Boston to Chicago. *Typhoid fever*, which last week caused 51 deaths, gives 64 deaths this week in a smaller aggregate population, showing an increase from 1.85 to 2.25 per cent. of all deaths; Boston, Philadelphia, and Cincinnati report 25 of the 64 deaths, and the remainder are mostly distributed as described under *diphtheria*. *Consumption* and *acute lung diseases*, giving a total of 785 deaths, as compared with 743 for the larger population represented last week, are increasing in fatality with the advance of winter. A change is also to be noted in the distribution of deaths, which last month showed in favor of the New England States, as compared with the chief cities of the South. This week a total population of 1,042,289 in 9 southern cities gives 98 deaths, while 99 are reported in a population of 856,134 in New England. The change is to be ascribed to the more sudden and extreme changes of temperature at the North; the relative mortality from the two diseases remains about the same, having been 27.1 last week and representing this week 27.5 per cent. of total deaths. *Small-pox* still prevails in the three cities in which it appeared, in the following order: Philadelphia, Washington, and Chicago. The first two report 3 deaths each, none occurring in Chicago this week. Cases are reported in Baltimore; if the report is correct, this city is the fourth in order of invasion since the appearance of the disease in November.

NOTICE.—The populations of cities of the United States adopted in the tables of the BULLETIN are those furnished by the city authorities to the National Board of Health. They differ in some cases from the figures given in mortuary reports.

Monthly report of mortality in cities of the United States.

Places.	Month.	Population.	Deaths under 5 years.	Total number of deaths.	Annual death-rate per 1,000.	Cerebro-spinal fever.	Consumption.	Diarrhœal diseases.	Diphtheria and croup.	Erysipelas.	Kidney diseases.	Lung disease, acute.	Malarial fevers.	Measles.	Puerperal diseases.	Scarlet fever.	Small-pox.	Typhus and typhoid fevers.	Whooping-cough.	Yellow fever.
	1879.																			
Burlington, Vt.	November	16,500	11	20	14.4	.....	3	1	2	.....	1	4	....	2	....	.....	....	.....	....	....
Burlington, Vt.	December	16,500	9	20	14.4	....	1	1	1	.....	.....	7	....	....	..	.....	....	1	....	....
Chattanooga, Tenn	November	12,000	11	21	21.0	.....	3	1	.....	.....	.....	4	1	....	....	.....	..	..	1	....
Chicago, Ill.	December	537,624	382	795	17.7	4	68	14	178	6	13	94	....	21	6	43	1	20	3	....
Columbia, S. C.	November	11,300	3	12	12.7	.....	2	.....	1	.....	1	2	1	....	....	.....	..	..	....	....
Columbia, S. C.	December	11,300	2	7	7.4	.....	1	.....	1	.....	.....	2	....	....	....	.....	..	..	....	....
District of Columbia	November	170,000	.....	277	19.5	.....	55	8	16	.....	4	41	4	....	4	3	..	7	1	....
Dunkirk, N. Y.	December	7,214	1	13	21.6	.....	2	.....	.....	.....	.....	1	....	..	....	.....	....	2	....	....
Elmira, N. Y.	...do	20,436	8	31	18.2	.....	3	4	2	.....	.....	.....	....	....	....	.....	..	2	1	....
Hudson County, New Jersey	November	199,000	.....	348	21.0	.....	58	9	33	2	.....	53	3	..	1	24	....	4	3	....
Keokuk, Iowa	December	15,000	5	17	13.6	.....	1	1	.....	.....	.....	1	1	1	1	5	....	1	....	....
Knoxville, Tenn	September	16,400	12	23	16.8	1	3	4	3	.....	.....	1	..	....	....	.....	....	3	....	....
Knoxville, Tenn	October	16,400	9	19	13.9	.....	1	3	.....	.....	1	2	..	....	....	.....	..	2	....	....
Knoxville, Tenn	November	16,400	8	20	14.6	.....	2	.....	.....	.....	.....	4	..	..	..	.....	....	2	....	....
New Haven, Conn	December	60,000	34	76	15.2	.....	9	.....	1	.....	5	9	1	6	..	.....	..	1	4	....
Minneapolis, Minn	November	52,000	23	55	12.7	.....	9	2	8	.....	.....	5	....	....	....	.....	..	7	1	....
Minneapolis, Minn	December	52,000	25	59	13.6	.....	7	.....	11	.....	2	12	..	....	....	.....	....	2	3	....
Norfolk, Va.	..do	24,000	22	64	32.0	.....	12	5	5	.....	.....	9	2	..	1	.....	....	....	....	....
Paterson, N. J.	November	40,000	39	85	25.5	.....	14	.....	11	.....	1	9	..	....	....	7	....	....	....	....
Paterson, N. J.	December	40,000	35	87	26.1	.....	18	1	6	.....	1	6	..	....	..	13	....	....	....	....
Richmond, Ind.	November	14,000	8	13	11.1	.....	1	.....	.....	.....	.....	3	1	..	....	.....	....	....	....	....
Saint Paul, Minn	...do	51,080	11	29	6.8	.....	4	.....	2	.....	.....	5	....	..	..	.....	....	4	..	....
Shelby County, Tennessee	December	.....	15	63	.....	.....	4	5	.....	.....	.....	15	5	....	2	.....	....	1	..	....
Toledo, Ohio	November	60,000	20	41	8.2	.....	3	1	3	.....	.....	6	1	....	....	2	....	..	....	....
Vineland, N. J.	December	8,500	4	8	12.7	.....	34	.....	.....	.....	.....	.....	....	....	....	.....	....	....	....	....
Wilmington, Del.	...do	44,000	19	60	16.4	....	15	1	7	.....	2	4	..	....	..	2	....	4	....	....
Totals		1,511,654	716	2,274	17.5	5	281	61	291	8	31	299	20	30	15	99	1	63	17	....

MORTALITY IN FOREIGN CITIES, COMPILED FROM WEEKLY CONSULAR REPORTS TO THE NATIONAL BOARD OF HEALTH.

Countries.	Places.	Population.	Week ending—	Total deaths.	Annual rate per 1,000.	Cholera.		Yellow fever.		Small-pox.		Typhoid fever.		Typhus fever.		Other contagious diseases.		Weekly mean thermometer.
						Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	
			1879–80.															
Vancouver's Island	Victoria	5,000	Dec. 27	2	20.8	...	...	...	...	...	...	...	...	...	...	...	...	30.0
Canada	Montreal	135,000	Jan. 3	59	....	...	...	...	...	...	6	...	1	...	...	...	5	15.2
Do	St. Johns	5,000	Jan. 3	1	10.4	...	...	...	...	...	...	...	...	...	...	...	...	18.0
Do	Charlottetown	12,000	Dec. 27	1	4.3	...	...	...	...	...	...	...	...	...	...	...	...	3.9
Bermuda	Hamilton	14,867	Dec. 30	1	3.5	...	...	...	...	...	...	...	...	...	...	...	...	70.3
Do	...do	14,867	Jan. 6	1	3.5	...	...	...	...	...	...	...	...	...	...	...	...	68.1
Turk's and Caicos Islands		3,500	Nov. 29	2	29.8	...	...	...	...	...	...	...	...	...	...	...	...	80.0
Do		3,500	Dec. 6	1	14.9	...	...	...	...	...	...	...	...	...	...	...	...	80.0
Do		5,000	Dec. 13	.....	.....	...	...	...	...	...	...	...	...	...	...	...	...	79.0
Do		3,500	Dec. 20	2	29.8	...	...	...	...	...	...	...	...	...	...	...	...	79.0
Do		3,500	Dec. 27	1	14.9	...	...	...	...	...	...	...	...	...	...	...	...	78.0
Do		3,500	Jan. 3	3	44.7	...	...	...	...	...	...	...	...	...	...	...	...	76.0
Hayti	Cape Haytien	7,500	Nov. 15	6	41.7	...	...	...	...	...	...	...	...	...	...	...	...	.....
Do	...do	7,500	Nov. 22	10	69.5	...	...	...	...	...	...	...	...	...	...	...	...	.....
Do	...do	7,500	Nov. 29	3	20.8	...	...	...	...	...	...	...	...	...	...	...	...	.....
Do	...do	7,500	Dec. 6	8	55.6	...	...	...	...	...	...	...	...	...	...	...	...	.....
Do	...do	7,500	Dec. 13	7	47.9	...	...	...	...	...	...	...	...	...	...	...	...	.....
Do	...do	7,500	Dec. 20	4	27.8	...	...	...	...	...	...	...	...	...	...	...	...	.....
Do	...do	7,500	Dec. 27	6	41.7	...	...	...	...	...	...	...	...	...	...	...	...	.....
Do	...do	7,500	Jan. 3	5	34.7	...	...	...	...	...	...	...	...	...	...	...	...	.....
Cuba	Havana	195,437	Dec. 27	113	30.1	...	...	...	4	...	1	...	...	...	...	..	...	75.0
Teneriffe	Santa Cruz	16,610	Dec. 13	11	34.5	..	...	...	...	...	..	..	..	..	..	8	3	68.2
Do	...do	16,610	Dec. 20	14	43.9	..	...	...	...	...	...	3	..	..	..	5	1	68.0
Ireland	Belfast	212,000	Dec. 20	141	34.7	..	..	...	...	...	..	5	...	..	..	40	14	43.0
Scotland	Leith	57,000	Dec. 20	29	26.5	...	..	...	...	...	...	..	1	..	..	2	1	38.8
Do	Dundee	150,923	Dec. 20	78	26.9	..	..	...	...	..	..	..	..	14	1	16	1	38.7
England	Liverpool	538,338	Dec. 27	367	35.5	...	..	...	...	2	..	6	4	3	..	65	64	37.7
Do	Bristol	210,000	Dec. 20	177	44.0	...	...	...	...	...	...	...	...	...	...	...	23	.....
Do	Newcastle on-Tyne	146,948	Dec. 20	74	26.3	...	...	...	...	...	...	...	1	..	..	...	10	39.0
Do	London	3,620,868	Dec. 20	2,204	31.7	..	..	...	...	..	2	..	26	..	..	...	292	32.7
France	Havre	92,068	Dec. 20	39	22.1	..	..	...	...	..	..	...	..	..	..	...	..	36.5
Do	Rouen	104,902	Dec. 27	82	40.8	...	..	...	...	...	..	...	..	..	..	...	...	42.4
Do	Paris	1,988,806	Dec. 18	1,306	34.2	....	..	..	..	..	51	...	38	....	..	...	26	.....
Do	Lyons	342,815	Dec. 13	190	28.9	...	...	...	...	...	..	...	2	...	...	...	...	50.9
Switzerland	Zurich	22,008	Dec. 20	7	16.6	...	...	...	...	...	...	...	..	...	1	...	..	.....
Holland	Amsterdam	308,952	Dec. 20	208	35.1	...	...	...	...	...	..	..	2	..	1	..	10	29.0
Do	Rotterdam	147,000	Dec. 20	104	36.9	...	...	...	...	...	..	..	..	..	..	36	2	.....
Saxony	Dresden	215,440	Dec. 13	77	18.6	...	...	...	...	...	..	..	..	1	1	3	3	18.4
Do	Leipsic	145,719	Dec. 20	87	31.1	...	...	...	...	...	..	..	..	..	..	..	21	17.0
Do	...do	145,719	Dec. 27	67	24.0	..	...	...	...	...	..	..	1	..	..	..	11	19.5
Do	Chemnitz	89,000	Dec. 13	29	17.0	...	...	...	...	...	..	..	..	..	..	..	1	12.0
Bavaria	Nuremberg	90,000	Dec. 13	43	24.9	...	...	...	...	...	..	..	2	..	..	...	8	12.6
Germany	Bremen	105,000	Dec. 13	47	23.3	...	...	...	...	...	..	..	..	..	..	..	..	22.3
Do	Frankfort	126,000	Dec. 13	9	37.2	...	...	...	...	...	..	..	..	..	..	..	..	27.0
Do	Berlin*	1,062,000	Dec. 13	496	.....	..	..	...	...	..	..	..	..	17	3	123	53	21.2
Do	Breslau	270,000	Dec. 13	138	26.6	..	..	...	...	..	..	..	2	..	..	24	14	12.2
Do	Mannheim	48,000	Dec. 20	21	22.8	...	...	...	...	...	..	..	..	..	..	..	..	13.5
Do	...do	48,000	Dec. 27	31	33.7	...	...	...	...	...	..	..	..	..	..	..	..	11.5
Do	Barmen	93,000	Dec. 20	42	45.6	...	...	...	...	...	..	..	..	..	..	..	3	25.0
Denmark	Copenhagen	225,000	Dec. 16	129	29.9	...	...	...	...	...	..	8	1	..	..	11	...	29.1
Italy	Leghorn	97,880	Dec. 20	82	43.7	...	...	...	...	...	..	...	..	..	..	..	..	39.4
Do	...do	97,880	Dec. 27	65	34.6	...	...	...	...	...	..	...	..	..	..	..	..	41.7
Sicily	Palermo	219,398	Oct. 19	75	17.7	...	..	...	...	...	..	...	3	..	1	..	4	64.4
Do	...do	219,398	Oct. 26	71	16.8	...	...	...	...	...	..	...	..	..	2	..	1	60.8
Do	...do	219,398	Nov. 2	82	19.4	...	...	...	...	...	1	...	2	..	..	..	1	66.4
Do	...do	219,398	Nov. 9	91	21.5	...	...	...	...	...	1	...	..	..	3	..	5	60.8
Do	...do	219,398	Nov. 16	85	20.1	...	...	...	...	...	1	...	..	..	1	..	1	57.2
Do	...do	219,398	Nov. 23	98	23.2	...	...	...	...	...	..	...	..	..	1	..	3	.....
Do	...do	219,398	Nov. 30	68	16.1	...	...	...	...	...	..	...	..	..	..	..	1	64.4
Austria	Trieste	127,873	Dec. 13	108	44.0	...	...	...	...	...	..	...	1	..	..	..	..	.....
Do	Vienna	737,285	Dec. 6	383	27.1	...	...	...	...	...	3	...	3	..	..	..	36	20.0
Do	...do	737,285	Dec. 13	375	26.5	...	...	...	...	...	8	...	..	..	..	..	29	15.8
Do	...do	737,285	Dec. 20	400	28.3	...	...	...	...	...	5	...	4	..	..	..	37	14.9
Do	Buda-Pesth	309,705	Nov. 22	203	34.2	...	...	...	...	...	5	...	..	..	3	..	2	.....
Russian Poland	Warsaw	336,703	Dec. 13	175	27.1	...	..	...	...	...	1	...	..	..	..	..	..	0.5
Sweden	Stockholm	169,429	Dec. 6	70	21.5	...	...	...	...	...	..	...	1	..	..	..	..	10.1
Do	...do	169,429	Dec. 13	71	21.8	...	...	...	...	...	..	...	1	..	..	..	5	22.1
Norway	Christiania	113,000	Dec. 13	40	18.5	...	...	...	...	...	..	2	..	..	..	12	...	5.4
Spain	Malaga	115,882	Dec. 13	81	36.4	..	...	...	...	...	..	3	..	..	..	3	...	61.0
Morocco	Tangier	15,000	Nov. 15	10	34.8	..	...	...	...	6	..	..	..	1	..	..	..	65.5
Do	...do	15,000	Nov. 22	8	27.8	...	...	...	...	2	..	...	..	..	..	..	..	65.2
Do	...do	15,000	Nov. 29	12	41.7	...	...	...	...	...	..	...	..	2	1	..	..	63.1
Do	...do	15,000	Dec. 6	6	20.8	...	...	...	...	...	..	...	..	..	..	..	..	64.0
Cape Colony	Cape Town	35,000	Dec. 1	21	31.3	...	...	...	...	...	..	...	..	..	..	..	..	75.0
Do	...do	35,000	Dec. 8	25	37.2	...	...	...	...	...	..	1	1	..	..	..	..	73.0
Mauritius	Port Louis	64,710	Nov. 16	40	32.2	...	...	...	...	...	..	...	1	..	..	..	..	73.5
Do	...do	64,710	Nov. 23	46	37.0	...	...	...	...	...	..	...	..	..	..	..	..	75.3
Do	...do	64,710	Nov. 30	35	28.2	...	...	...	...	...	..	...	..	..	..	..	..	75.1
Do	...do	64,710	Dec. 7	44	35.4	...	...	...	...	...	..	...	..	..	..	..	..	77.1
Egypt	Port Said	10,000	Nov. 8	3	15.6	...	...	...	...	...	..	...	..	..	..	..	..	73.0
Do	...do	10,000	Nov. 15	.....	.....	...	...	...	...	...	..	...	..	..	..	..	..	70.0
Do	...do	10,000	Nov. 22	1	5.2	...	...	...	...	...	..	...	..	..	..	..	..	68.0
Do	...do	10,000	Nov. 29	1	5.2	...	...	...	...	...	..	...	..	..	..	..	..	65.0
Do	...do	10,000	Dec. 6	2	10.4	...	...	...	...	...	..	...	..	..	..	..	..	62.0
Do	...do	10,000	Dec. 13	.....	.....	...	...	...	...	...	..	...	..	..	..	..	..	65.0
Do	...do	10,000	Dec. 20	1	5.2	...	...	...	...	...	..	...	..	..	..	..	..	65.0

*Hospitals only.

Reports from Hospitals in the United States.

Name of hospital.	Place.	Character of hospital.	Number of beds.	Patients at last report.	Consumption.				Croup.				Diarrhœal diseases.				Diphtheria.				Fever, enteric.				Fever malarial.				Fever, scarlet.				Lung diseases, acute.				Measles.				Puerperal diseases.				Smallpox.				Totals.			
					Admitted.	Discharged.	Died	Remaining.	Admitted.	Discharged.	Died.	Remaining.	Admitted.	Discharged.	Died.	Remaining.	Admitted.	Discharged.	Died.	Remaining.	Admitted.	Discharged.	Died.	Remaining.	Admitted.	Discharged.	Died.	Remaining.	Admitted.	Discharged.	Died.	Remaining.	Admitted.	Discharged.	Died.	Remaining.	Admitted.	Discharged.	Died.	Remaining.	Admitted.	Discharged.	Died.	Remaining.	Admitted.	Discharged.	Died.	Remaining.
Hartford hospital	Hartford, Connecticut	General	150	105	1	...	...	9	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	2	...	...	...	7	...	...	...	1	...	1	...	...	...	...	...	...	...	...	...	1	1	...	21	2	2	106
Presbyterian hospital	New York	General	90	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	9	11	...	58
Saint John's hospital	Brooklyn	General	23	16	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3	...	...	3
Hart's Island hospital	Ward's Island, New York	General	305	...	...	...	...	...	...	...	...	...	1	...	...	1	...	...	...	...	1	...	...	1	2	1	...	1	...	...	...	...	4	1	1	2	...	...	1	...	...	...	...	...	8	2	2	5
State emigrant hospital	Hart's Island, New York	General	300	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	7	5	3	258
Saint Barnabas hospital	Poughkeepsie, New York	General	13	11	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	2	...	10
Albany hospital	Albany, New York	General	....	4	...	...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...	...	...	...	...	...	...	...	4	...	...	4
Marshall Infirmary	Troy, New York	General	50	34	1	...	...	6	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	2	...	...	32
St. Joseph's Hospital	Syracuse, New York	General	46	26	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3	...	...	26
Rochester city Hospital	Rochester, New York	General	125	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	12	...	...	77
German Hospital	Newark, New Jersey	General	50	...	2	...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	1	...	6	3	...	3
Saint Barnabas Hospital	.... do	General	45	39	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	5	...	1	4
Saint Michael's Hospital	.....do	General	130	142	2	1	1	9	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	1	1	...	...	12	...	...	...	1	5	1	13	...	...	...	...	...	...	...	...	29	18	3	141
Memorial Hospital	Orange, New Jersey	General	13	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	6
Saint Joseph's Hospital	Paterson, New Jersey	General	90	...	5	...	...	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
University of Pennsylvania Hospital	Philadelphia, Pennsylvania	General	130	...	...	...	...	4	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...
German Hospital	.....do	General	....	...	...	...	...	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3
Jewish Hospital	.....do	General	40	20	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3	2	...	19
Presbyterian Hospital	.....do	General	76	50	1	...	...	3	...	...	...	...	...	...	...	1	...	...	...	...	...	1	1	...	...	...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	1	7
Saint Francis Hospital	Pittsburgh, Pennsylvania	General	125	...	...	...	...	...	...	...	...	...	2	...	2	...	...	...	...	...	...	...	...	...	1	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	8	...	1	7
Homœopathic Hospital	.....do	General	40	23	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3	...	...	...	...	1	...	...	...	...	...	...	...	7	4	...	26
Providence Hospital	Washington, D. C	General	160	150	21	...	...	21	...	...	...	...	5	...	5	...	...	...	...	...	...	...	...	27	3	...	...	24	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	150	11	...	139
Retreat for the Sick	Richmond, Virginia	General	50	23	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	5	4	...	23
Post Hospital	Mobile, Alabama	General	62	7	7	...	...	...	...	...	...	...	2	...	...	...	...	...	...	...	...	...	...	2	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	49	...	...	...
Saint's Mary and Elizabeth Hospital	Louisville, Kentucky	General	113	11	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Alexandria Hospital	Chicago, Illinois	General	75	...	5	...	...	5	...	...	...	...	...	...	...	1	...	...	1	7	...	...	7	2	2	...	...	1	...	...	1	...	5	...	...	5	1	...	...	1	...	...	...	...	...	71	9	...	62
Naval Hospital	Chelsea, Massachusetts	General	100	...	1	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Naval Hospital	Brooklyn, New York	General	115	...	...	...	...	2	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	5	...	...	...	2	1	...	9	...	...	...	...	...	...	...	...	...	...	...	...	...
Naval Hospital	Washington, D. C	General	50	10	...	...	...	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	10
Naval Hospital	Norfolk, Virginia	General	68	60	...	...	...	5	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	1	...	...	...	1	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	55
Naval Hospital	Pensacola, Florida	General	20	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Municipal Hospital	Philadelphia, Pennsylvania	Contagious diseases	144	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...	...	2	...	...
Riverside Hospital	New York City	Contagious diseases	150	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	...	...	...	...	...	...	1	...	...	2	...	1
State Hospital	Philadelphia, Pennsylvania	Women and child'n	16	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	2	1
State Hospital for Women	Chicago, Illinois	Diseases of women	15	12	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2	1	...	13
Saint Mary's Free Hospital for Children	New York City	Children	26	20	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	2	3	2	17
Children's Hospital	Washington, D. C	Children	72	...	...	...	...	1	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	5	2	1	27
Lunatic Hospital	Boston, Massachusetts	Insane	200	164	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3	1	2	154
Retreat for Insane	Hartford, Connecticut	Insane	145	139	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	4	2	...	141
New Jersey State Asylum for Insane	Trenton, New Jersey	Insane	....	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	511
Pennsylvania Hospital for Insane	Philadelphia, Pennsylvania	Insane	500	384	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	386
State Hospital for Insane	Danville, Pennsylvania	Insane	700	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	445
Hospital for Insane	Catonsville, Maryland	Insane	350	335	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	7	...	1	342
E. L. Asylum	Williamsburg, Virginia	Insane	329	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	...	...	317
North Carolina Insane Asylum	Raleigh, North Carolina	Insane	....	267	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1	266
Alabama Insane Hospital	Tuskaloosa, Alabama	Insane	400	399	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3	3	1	398
Columbus Asylum for Insane	Columbus, Ohio	Insane	900	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Longview Asylum	Carthage, Ohio	Insane	679	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
Indiana Hospital for Insane	Indianapolis, Indiana	Insane	640	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	14	4	1	423

SMALL-POX IN THE DISTRICT OF COLUMBIA.

Dr. S. TOWNSHEND, health officer, makes the following report for the week ending January 10:

During the week ending January 10 there were 11 new cases of small-pox reported, making a total of 32 cases since November 20, 1879, date of first report. Of this number 5 were white, 6 colored, 5 males, and 6 females. Three deaths occurred, 2 of colored persons, and 1 white. Of the 11 new cases 7 are reported on premises where the disease has previously existed, and 4 in other localities. Removal to hospital was only considered necessary in 1 case, and the other 10 are isolated in their houses. Two of the 11 persons attacked had never been vaccinated; 4 not since infancy; 4 not within five years, and the other 2 only after having become infected. The character of disease as classified shows 4 cases of varioloid, 2 of distinct variola, and 5 confluent small-pox. Three of the 4 cases in houses not previously infected are in the locality where the disease has been prevailing, namely, the southeastern section, and the fourth on H street, between Second and Third streets, N. W. The only case where we can obtain any evidence of contagion is that of a man at 1352 E street, S. E. He is a restaurant keeper, and states that about twelve or fourteen days previous to his being taken with the disease a "tramp" came into his place and took a seat by the fire. He seemed drowsy and a peculiar odor was emitted from his clothing, which odor he states was exactly the same as that thrown off from his own body when the fever came on. Considerable difficulty was experienced in getting rid of the tramp, and it is probable that he may have been suffering from an attack of varioloid.

The work of vaccinating the poor is proceeding very satisfactorily, something over six thousand having been vaccinated up to date.

ABSTRACTS FROM CONSULAR REPORTS.

CANTON, CHINA.—F. D. Cheshire, vice-consul in charge, sends the following report, under date of October 30, 1879:

My reports from this city will have but little value as regards the preventing of the introduction of contagious diseases into the United States, from the fact that vessels very seldom load within this consular district bound direct for the United States. Most of the cargo shipped here is carried by river steamers to Hong-Kong, and then transhipped to vessels loading for foreign ports. It will be impossible to obtain any reliable information from the Chinese officials, as they do not keep any record or publish any official reports, except those connected with the Chinese Imperial maritime custom service.

CANTON, CHINA.—U. S. Vice-Consul F. D. Cheshire forwards partial reports for the weeks ending November 15, 22, and 29. The mean temperature for the three weeks was about 76°; and the prevailing diseases were malarial fevers and dysentery, as previously reported. Urinary calculus is noted as being very common.

NINGPO, CHINA.—U. S. Consul Edward C. Lord sends reports for the weeks ending November 15, 22, and 29, but can add nothing of importance to the information given in previous reports. No data can be obtained for reporting the mortality, and the population is only roughly estimated at 300,000. Most of the zymotic diseases are usually present among the natives, but no epidemic prevails at this time.

HANKOW, CHINA.—U. S. Consul I. T. Shepard, in his report of November 22, 1879, estimates the population of this city at 750,000, of which not more than 100 are permanent residents of foreign birth. No American vessels have visited the port for several years, though cattle are brought from America to points between Hankow and Shanghai. For a native city, the general sanitary condition is good. Small-pox is always present, but seldom prevails as an epidemic.

SWATOW, CHINA.—U. S. Consular Agent C. C. Williams reports, under date of November 15, that no records of mortality among the natives can be obtained. No deaths had occurred during the week ending November 15 among the foreign residents, most of whom have houses in the country, to which they go when any dangerous disease appears in the town. Bad drainage and other unsanitary conditions cause much malarial fever and dysentery. Leprosy, in various forms, is common throughout the district. A central gutter carries a stream of foul water through the middle of each principal street, forming stagnant pools in some places. The native population is estimated at 26,000. The people live in closely-crowded small houses, badly ventilated, and rendered still more unwholesome by the use of open charcoal fires.

ST. THOMAS, WEST INDIES.—U. S. Consul V. V. Smith sends a report of 15 deaths in a population of 15,000, for the two weeks ending December 15, 1879, being at the annual rate of 26 per 1,000. Mean temperature for the month, 76°; sanitary condition good, and no contagious disease prevailing.

BATAVIA, JAVA.—November 22, 1879, United States Consul O. Hatfield reports that "a slight fever known as *Java* has attacked the crews of several vessels, but no fatal cases have occurred." The disease is supposed to be of malarial origin, and is not contagious. The rainy season was just beginning, and the mean temperature very high, being 91.5° Fahrenheit. No record of deaths can be obtained.

BUENOS AYRES.—United States Consul E. L. Baker reports 654 deaths for the month of October, 1879, in a population estimated at 250,000, being at the annual rate of 31.4 per 1,000. Small-pox caused 28 deaths, typhoid fever 6, and scarlet fever 5. The small-pox was said to have been introduced by some captive Indians, sent in from the frontier. In the month of November 632 deaths were reported, the annual rate being 30.3 per 1,000. Small-pox had increased, causing 61 deaths; typhoid fever 18, and diphtheria 13. Mean temperature for the month, 76°. The alarm caused by the case of yellow fever (reported in the BULLETIN) had been beneficial in leading to a thorough cleaning of the city.

BUENOS AYRES.—November 28, United States Consul E. L. Baker reports as follows:

The quarantine of fifteen days imposed on vessels from ports infected with yellow fever, and announced in my letter of November 21, has been modified so as to reckon the time from the date of clearing from such ports. But all vessels coming from the Antilles, or from the southern ports of the United States, are quarantined for three days, though the voyage requires more than fifteen days. Since the single case of yellow fever previously reported, no other has occurred, and every precaution has been taken to prevent the introduction or spread of the disease. Under these circumstances, I give a clean bill of health to the bark Samuel B. Hall, of Portland, which clears to-day for Boston.

SYDNEY, AUSTRALIA.—November 26, 1879, United States Consul J. H. Williams makes the following report:

The population of Sydney and its suburbs is about 120,000; there is a voluntary health association, and the authorities keep records of births, deaths, and marriages, but there are no statistics of disease. Asiatic cholera and yellow fever are not known here. Sporadic cases of small-pox have occurred from imported contagion, but the disease

has never spread, and probably not more than six cases have appeared in the last ten years. Scarlet fever prevails every winter, and is quite fatal among children; measles, also, are occasionally epidemic.

JACMEL, HAYTI.—December 1, 1879, United States Consular Agent A. H. Lazare makes the following report:

No reliable statistics can be obtained here. When a death occurs the authorities are informed and a permit for burial is granted without requiring the cause of death to be stated. The town has a population of 7,500, and is considered one of the healthiest ports in Hayti. Epidemic diseases rarely occur here. During last summer there were a few cases of yellow-fever on vessels in this harbor, but it is presumed that the infection was brought here from other ports, as it never spread in the city.

BATAVIA, JAVA.—November 22, 1879, United States Consul O. Hatfield makes the following report:

Small-pox has broken out at a native village some distance from the city, but the prompt measures taken by the authorities have effectually prevented its spread. Forty-two persons, all natives, were attacked in the course of two days; seven died; the rest have recovered or are reported convalescent. The general health of this city is good, and no contagious disease is known to exist here at present.

LAMBAYEQUE, PERU.—United States Consul S. C. Montjoy makes the following report, December 1, 1879:

No sanitary statistics are kept in the cities and towns of this consular district, and private information from practicing physicians is the only source of data for reports. The various forms of malarial fever are the prevailing diseases here, and consumption is not rare. Small-pox is never absent, and becomes epidemic every few years, though vaccination is practiced weekly by the government physicians. Yellow fever, in a mild form, was epidemic in 1856, and again in 1868, when it proved very fatal to foreigners and people from the interior; a few sporadic cases occur every year. Asiatic cholera and diphtheria are unknown here, and croup is very rare; whooping cough has been mildly epidemic during the past year. Consumption is here regarded as curable when taken in time, by a residence in any of the neighboring mountain towns, at an elevation of from 6,000 to 10,000 feet. The sanitary regulations are limited to carrying away the dry rubbish of the streets. Excrements are thrown into the back yards, or *corrals*, where the sun soon reduces them to a dry and odorless mass. A very slight rainfall in March or April is rather the exception, the rule being the absence of rain during the whole year. All agriculture requires artificial irrigation, the water being led from mountain streams. The supply for domestic use is brought in barrels, on the backs of donkeys or in carts. The annual range of the thermometer is only between 70° and 88° Fahrenheit.

SABANILLA, UNITED STATES OF COLOMBIA.—United States Consul E. P. Pellet sends the following report, under date of December 10, 1879:

On the 30th of September I reported that small-pox had appeared in Baranquilla, and that it was deemed unsafe to grant clean bills of health. October 5, I and other consuls resumed the issue of clean bills, finding that the reports were greatly exaggerated.

About the middle of October a young Greek, lately arrived in this city, was taken with a fever which proved an undoubted case of yellow fever. This is the first appearance of the disease during the fourteen years of my residence here. A few days after the appearance of the case above noted, an American was attacked and died of black vomit. Six other deaths followed, all persons lately arrived from abroad or from the interior; every case that occurred proved fatal. No new case has appeared in the last ten days, but I do not yet feel justified in giving clean bills of health, which were suspended from the appearance of the first case.

The first introduction of small-pox here was undoubtedly from Cuba by vessels in the cattle trade. Last year when small-pox and yellow fever pervaded nearly all the ports of Cuba, we were in daily communication with them. There are no quarantine regulations, and in reply to my representations of the danger incurred, the governor stated that no such abridgment of the liberty of citizens could be allowed here. The sanitary conditions of the place are naturally most favorable, but out of a population of nearly 20,000 not more than 5,000 can be said to have medical attention when ill. The remainder, known as *gente del pueblo*, or common people, fall sick, sleep on the ground in their huts, have, perhaps, no medicine and little care, and die as a rule—recovery from serious illness being the exception. But as regards contagious or infectious diseases, Baranquilla is an unusually healthy port.

TUNIS, NORTH AFRICA.—United States Consul G. W. Fish gives the following report of this city, under date of December 12, 1879:

I have received the circulars and Bulletins sent out by the National Board of Health, and have been interested in perusing the latter, and regret my inability to contribute something from this distant part of the world to the valuable fund of statistics which the Board of Health is furnishing. The Regency of Tunis, bounded north and east by the Mediteranean Sea, south by the Great Desert, and west by Algiers, lying between latitudes 31° 40′ and 37° 12′ north, and longitudes 7° 45′ and 11° 33′ east, is said to contain a land area of about eighty thousand square miles, and has a present (estimated) population of from one and a half to two millions. Tunis is the most important city, and has a population of from one hundred and thirty to one hundred and fifty thousand, made up as follows: Thirty thousand Jews, from twelve to fifteen thousand Christians, so called, and the remainder are all Mohammedans, made up of Arabs, Moors, and negroes. The city is of great antiquity, and is, perhaps, the most distinctively oriental town in the world at the present time. The portion of the city known as the Arab quarter is well policed, and is kept reasonably clean, while the Jewish and (so-called) Christian quarters are often exceedingly dirty. There is no plan of collecting and reporting vital statistics, and no record is kept from which a correct estimate can be compiled, embracing the nature of prevailing diseases and the percentage of deaths.

A sanitary commission has been organized, of which all the foreign consuls residing in Tunis are members, and each in his turn serves as president for a period of six months, the writer of this being at this time president. The Tunisian Government is represented on the commission by the prime minister, the minister of foreign affairs, the president of the municipal council of Tunis, a medical officer appointed by the bey, a permanent secretary, and an interpreter. Each port of entry, and all the large towns of the regency, have a sanitary agent, who is nominated by the commission and commissioned by the bey, whose duty it is to examine all cases of sickness where there is reason to fear contagion or infection, and report all such cases to the president of the commission. The city of Tunis is noted for its dry, healthful, and salubrious climate. It has a system of sewerage which, if kept in good repair, ought to make it one of the most healthy cities in the world. We have been for a long time almost singularly free from yellow fever, cholera, small-pox, and the plague. But I find that at certain seasons of the year diseases are apt to assume a typhoid type and prove obstinate, and not unfrequently fatal. Several cases of fatal diphtheria among young people have come to my knowledge within the last year, as well as typhoid fevers and cases of typhoid pneumonia, all of which are exceedingly obstinate and of fatal tendency from the beginning. At the last meeting of the sanitary commission, held in November, an attempt was made by the consuls to inaugurate a system of reports of cases of sickness and deaths, and a plan of vital statistics, with a complete mortuary record, which was opposed by the native Arab members of the commission. We hope, however, to overcome this opposition, and ere long to be able to report the vital and mortuary statistics of this most interesting and almost unknown country.

REPORTS FROM CORRESPONDENTS OF THE NATIONAL BOARD OF HEALTH.

ELMIRA, N. Y.—Under date of January 7, Dr. H. D. Wey reports that the only board of health in that city is the common council, which has power to resolve itself into such a board, with the mayor as president *ex officio*. Under existing circumstances only monthly reports can be made, as the data are collected from the records kept at the different cemeteries.

GUNN CITY, MO.—January 2, 1880, Dr. H. D. Gilliland makes the following report:

This town has only about 150 inhabitants, and, with the exception of malarial fevers, the general health of the community is good; no epidemic disease has prevailed here since the cholera of 1850–'51. The healthful condition of the place is not due to any sanitary measures or precautions on the part of the town authorities, and there are many nuisances which I have endeavored in vain to have removed. In the absence of legislation, it is almost impossible to secure any organized attention to sanitary measures or regular reports of mortality from physicians.

LA SALLE, ILL.—December 20, 1879, Dr. F. Clendinen makes the following report:

Our city, of 10,000 inhabitants, is well situated for drainage, the ground sloping toward the Illinois River on the south. We have

good ordinances as to privies, &c., but they have only recently been enforced. The population is largely foreign, and not generally disposed to adopt active measures of sanitation. A few cases of scarlet fever and diphtheria, in November, were confined to the German and Polish people in the worst drained part of the town. The requirement of burial permits will be urged upon the city council at its meeting next month.

SALEM, FAUQUIER CO., VA.—December 24, 1879, Dr. F. Horner, jr., makes the following report of the diseases of this region:

This country lies in the "Piedmont" section, between tide-water and the Blue Ridge Mountains, and is noted for the healthfulness of its climate and the vigor of its inhabitants. Springs are abundant, many of them well known as possessing valuable medicinal qualities. Among the zymotic diseases, typhoid fever appears yearly in autumn and winter, but is generally absent during the summer; this disease is here regarded as infectious to such extent as to suspend all social intercourse with any family in which it is known to exist. Diphtheria and scarlet fever are rare visitations, and have not been epidemic here since the war.

RED WING, MINN., January 10.—Dr. Charles N. Hewitt, referring to the order in which the States are named on page 207 of the BULLETIN, observes that Minnesota preceded Michigan in the organization of a State board of health. He gives the following dates for the several States referred to: California, April 22, 1870; Virginia, May 18, 1872; Minnesota, March 26, 1872; and Michigan, July 30, 1873.

BURLINGTON, VT.—January 10, 1880, Dr. George M. Ockford writes as follows:

The city has been in quite a healthy condition during the month ending January 10. There have been no epidemic or contagious diseases, excepting an occasional case of measles. A number of cases of congestion of the lungs following measles, as well as pneumonia and bronchitis, have occurred. Catarrh has been prevalent, with a tendency to diarrhœa as a secondary condition.

From the report of the health officer we find that zymotic diseases caused 23.58 per cent. of all deaths from known causes in 1879. Diphtheria was the leading disease, having caused 22 deaths; cholera infantum caused 18, measles 3, and typhoid fever 2 deaths. There is no doubt that many cases of zymotic disease that occurred during the past year could have been prevented by a proper system of quarantine and sanitary measures. We need a State board of health, as well as local organizations with adequate powers. It is well known that nuisances exist in the city and that the health officer has repeatedly called the attention of the city authorities to the necessity of abating them; but without adequate power to enforce his recommendations, a most efficient and capable officer is thwarted in his efforts to promote sanitary reform. The legislature does not meet this year; but next year the question of a State board will no doubt be presented, as it has been in years past. Biennial legislatures are difficult bodies to wake up to the necessity of sanitary or other scientific reforms. Nearly every session is marked by large accessions of raw legislators, elected in many instances from among the farming population, who are extremely conservative in their notions of political economy and uneducated in the wants of growing cities and towns. Another source of opposition has existed among many members of the medical profession; but we must ascribe their action to the same causes that prompt the legislators to reject bills for health boards—*damnant quod non intelligunt;* and we have only to hope that they may have more light in the future.

MISCELLANEOUS.

STEUBENVILLE, OHIO.—Mr. John Irwin, mayor of the city, reports under date of January 6 that there is no provision for collecting and reporting vital statistics or returns of mortality. No other information than the number of interments can at present be furnished.

HAVANA, CUBA.—Advices to January 1 state that during the month of December there were 13 deaths from yellow fever, of which 5 occurred in the last week of the month.

CORRESPONDENTS OF THE NATIONAL BOARD OF HEALTH

Name.	Residence.
Allen, T. J., M. D	Shreveport, Louisiana.
Ambrook, Charles, M. D	Boulder, Colorado.
Bates, C. B., M. D	Santa Barbara, California.
Balch, G. B., M. D	Yonkers, New York.
Betton, George W., M. D	Tallahassee, Florida.
Bibb, R. H. L., M. D	Austin, Texas.
Burroughs, R. B., M. D	Jacksonville, Florida.
Bullard, G. B., M. D	Saint Johnsbury, Vermont.
Baird, James B., M. D	Atlanta, Georgia.
Brewer, Charles, M. D	Vineland, New Jersey.
Blain, J. S., M. D	Brunswick, Georgia.
Barnard, A. F., M. D	Saint Mary's, Georgia.
Cleemann, R. A., M. D	Philadelphia, Pennsylvania.
Cochran, Jerome, M. D	Mobile, Alabama.
Carter, J. L., M. D	Dallas, Texas.
Cummings, J. B., M. D	Forrest City, Arkansas.
Compton, J. W., M. D	Evansville, Indiana.
Dancy, F. W., M. D	Holly Springs, Mississippi.
Dement, J. J., M. D	Huntsville, Alabama.
Dale, E. T., M. D	Texarkana, Arkansas.
Dennison, Charles, M. D	Denver, Colorado.
Delaney, E., M. D	Fond-du-Lac, Wisconsin.
Dibrell, J. A., M. D	Little Rock, Arkansas.
Dorsey, R. W., M. D	Pilot Point, Texas.
Ellis, Charles M., M. D	Elkton, Maryland.
Evans, S. T., M. D	Union City, Tennessee.
Foote, G. M., M. D	Galesburg, Illinois.
Ford, D. W., M. D	McComb City, Mississippi.
Fisher, George J., M. D	Sing Sing, New York.
French, George F., M. D	Portland, Maine.
Freeland, N. H., M. D	Tarrytown, New York.
Fite, C. C., M. D	Shelbyville, Tennessee.
Fulgham, F. L., M. D	Crystal Springs, Mississippi.
Grissom, E., M. D	Raleigh, North Carolina.
Gilliland, H. D., M. D	Gunn City, Missouri.
Hope, W. T., M. D	Chattanooga, Tennessee.
Hipolite, W. W., M. D	Devall's Bluff, Arkansas.
Holton, H. D., M. D	Brattleborough, Vermont.
Horner, Frederick, M. D	Salem, Virginia.
Hays, J. M., M. D	Philadelphia, Pennsylvania.
Holden, Edgar, M. D	Newark, New Jersey.
Hyndman, J. G., M. D	Cincinnati, Ohio.
Hawkins, A. W., M. D	Huntingdon, Tennessee.
Harris, T. W., M. D	Chapel Hill, North Carolina.
Hough, F. B., M. D	Lowville, New York.
James, B. W., M. D	Philadelphia, Pennsylvania.
Jenkins, J. Foster, M. D	Yonkers, New York.
Jones, N. E., M. D	Circleville, Ohio.
Jepson, S. L., M. D	Wheeling, West Virginia.
Kellogg, J. H., M. D	Battle Creek, Michigan.
Knowles, L. D., M. D	Kendall, Michigan.
Kittrell, B. F., M. D	Black Hawk, Mississippi.
Le Hardy, J. C., M. D	Savannah, Georgia.
Lindley, Walter, M. D	Los Angeles, California.
Lowman, Prof. J. H	Cleveland, Ohio.
Logan, J. P., M. D	Atlanta, Georgia.
Mallett, J. W., M. D	University of Virginia.
Moore, R. C., M. D	Omaha, Nebraska.
Mosher, J. S., M. D	Albany, New York.
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Needham, W. C. H., M. D	Gallipolis, Ohio.
Nagle, John T., M. D	New York, New York.
Oulton, W. B., M. D	Saint Louis, Missouri.
Ockford, G. M., M. D	Burlington, Vermont.
Porcher, F. P., M. D	Charleston, South Carolina.
Parr, T. S., M. D	Indianola, Texas.
Rumbold, T. F., M. D	Saint Louis, Missouri.
Smith, N. G., M. D	Lewisville, Indiana.
Stedman, Joseph, M. D	Jamaica Plain, Massachusetts.
Staples, F., M. D	Winona, Minnesota.
Saunders, L. L., M. D	Grenada, Mississippi.
Stearns, J. H., M. D	Milwaukee, Wisconsin.
Summerell, J. J., M. D	Salisbury, North Carolina.
Snow, E. M., M. D	Providence, Rhode Island.
Stabler, E. A., M. D	Alexandria, Virginia.
Tadlock, A. B., M. D	Knoxville, Tennessee.
Van Ernan, J. H., M. D	Kansas City, Missouri.
Wey, H. D., M. D	Elmira, New York.
Wells, E. F., M. D	Minster, Ohio.
Wall, John P., M. D	Tampa, Florida.
Woodworth, P. M., M. D	Chicago, Illinois.
Young, B. S., M. D	Santa Rosa, California.

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Heat as Disinfectant —

Fires were burned in ancient cities to arrest pestilence not long after Pythagoras —

Pliny said — Est in ignibus medicamen vis — It has also long been known that the highest tropical heat is a specific for the plague in the East —

But like many other principles of sanitary & other science, this lay long dormant, unproductive.

Christ, in modern times, Dr Henry of Manchester, Engd — began experiment 1824 — published in Phil. Mag. 1831-2. He proved by admirable investigations — 1st — that vaccine virus was made inert by 140°; then that as far as a number of fair trials went, small pox poison & the contagious

of typhus & scarlet fever were made powerless by 200° —

Further — that clothing & merchandise (dry goods) including fine silks, are not injured by the heat necessary for disinfection.

Incidentally it may be mentioned that common flame has a heat of from 1000° to 1140° F. — red coals 980° — boiling water 212° — lowest scalding heat 150° — Hot air bath ranges from 130° to 250° — dry vegetable tissues only begin to carbonize at 222° Ovens bake at 320° to 400° — Flat irons are used at about 300° in ordinary ironing — Sulphur ignites at 560° —

In regard to the disinfecting power of heat,

An important practical experiment on a large scale was for the first time performed in 1887 by Dr von Busch of Berlin — when Prof. Pfuel ordered, in spite of repeated cleanings, the Berlin Lying-in Hospital, the interior to be heated all the wards, for three days, to 150°. Then the same class of patients was re-admitted — without any fever whatever! A triumph of disinfection.

Few similar experiments have yet been made.

But in the (8th vol. of the) Royal Med. Chirurg. Trans (as quoted by E. Harris)

Dr M. Ferguson, Inspector General
of Hospitals finds an endemic of Yellow
fever breaking out on the
British transport ship (the Argyleshire), he
took precautions to prevent its
spread. But when the vessel
was entirely cleared & with
hatchways closed, the hold
was exposed to the concentrated
heat of many days, the fever
ceased.

Dr A. H. Bell of Brooklyn
in attempted yellow fever
narrates a like success in 1847,
near Vera Cruz — with (the) U. S.
Steamer (Orizaba) & gunboat (Marion).
He used steam from the (Orizaba) engine.

[End of 19th Lecture, 1873]

To Dr Ed Curtis
of New York, Respectfully
suggest and urge
the value of Boards, either Dry
or by Steam, — in the prophylaxis
of the U.S. National Calamity
Yellow Fever in 1866 Boston
Practical Suggestions in
Brief and in aid of the
application of the principle
which of course is almost alone
available in Ships, Hospitals or the
buildings, less so in Cities or Towns
But of course Boards is very great
protection against
Asiatic cholera versus cholera (1866) in New York.

AMERICAN MEDICAL ASSOCIATION.

We have received the following note from Dr. FRANCIS G. SMITH, Chairman of the Committee of Publication of the American Medical Association.

The *best* way to relieve the treasury of the Association will be for members who do not possess all the back volumes to purchase those lacking to complete their sets, thus, while aiding the Committee, adding value to their own libraries.

DEAR SIR.—The Committee of Publication are obliged to appeal to the members of the American Medical Association for contributions of money to defray the expenses of printing and illustrating the Transactions of the last meeting.

The amount of assessments at the meeting in Baltimore falls short of that required, by more than one thousand dollars, and unless this deficiency is supplied the volume cannot be published.

Many members have expressed their willingness to contribute, and one has agreed to give a hundred dollars, if there is any prospect of aid from others. You are earnestly requested to contribute, and to forward whatever amount you may be disposed to give, to Dr. C. WISTER, 1303 Arch Street, Philadelphia.

Notes and Comments.

Steam as a Disinfectant.

Important experiments have been carried on during the last few weeks under the supervision of Dr. A. N. BELL, of Brooklyn, aided by Drs. STILES, CONKLIN, J. LEE, and others. The experiments were made at Seguin's Point.

Dr. BELL contends that steam is a far better disinfectant than chlorine, the latter remedy rotting the clothes, while the former is thoroughly efficacious, and makes not the slightest difference in the clothes, beyond the great one of disinfecting them of all disease.

The apparatus used for the experiments was simply an ordinary steam boiler of three-horse power, and a WOODWARD'S force pump—the latter connected with a coil of pipe 360 feet in length, inclosed in another furnace, by which the steam from the boiler is superheated and makes dry steam. From this furnace a section of pipe is carried to a small chamber containing about 500 cubic feet, in which the disinfecting is to be done. The pipe was in the centre of the floor, from which the steam is concentrated. On the wall was a self-registering thermometer; on the top of the partition of this room was another thermometer, and at the bottom still another. These were placed there to mark the different degrees of temperature during the experiments.

The experiments commenced by a five minutes' test, during which time some oysters, clams, fish, and three eggs, through eight thicknesses of blanket were cooked. By this it was understood to show that all animal matter being subjected to the action of super-heated steam will at once be

destroyed. At the commencement of the test the lower thermometer marked 90 degrees Fahrenheit, and the upper one 83 degrees. During the five minutes occupied in the experiment the gauges of heat stood as follows:

Minutes.	Lower Ther. Degrees.	Upper Ther. Degrees.
1	105	120
2	155	178
3	185	220
4	202	202
5	200	198

A second test was then made, which lasted ten minutes—oysters, eggs, &c., being put in as before, as well as a coat and a pair of white linen pantaloons. Before the door was shut the indicator marked 162 degrees (the lower) and 140 degrees (the upper). The annexed table will show the various degrees of heat obtained:

Minutes.	Lower Ther. Degrees.	Upper Ther. Degrees.
1	167	165
2	180	190
3	185	196
4	192	202
5	195	210
6	198	214
7	202	216
8	202	216
9	205	220
10	208	225

The self-registering thermometer indicated 260 degrees. Dr. BELL accounted for the variation of the lower and upper thermometers by the fact of the lower one being connected with the chamber by an iron tube. Iron being a conductor of heat prevented it marking the gradations of heat correctly. The clothing placed in the room was perfectly dry, and the linen pants, now considered perfectly disinfected from all disease, were as dry as a bone, and the starch and folds made by ironing were not even taken out of them. This, Dr. BELL claims, is done by his steam being super-heated, which is the secret of his success as a disinfectant. To thoroughly cleanse and purify the clothes of emigrants and passengers will take two hours; at the end of which time it will be considered safe to allow them to go anywhere they please.

A retort can be attached to the steam pipe, capable of injecting any volatile substance or disinfecting agent into the chamber, such as chlorine, carbonic acid, fumes of coal tar, &c. If used, these chemicals will be heated to the utmost intensity, thus giving them greater power.

It is stated that a ship can be disinfected in the same way. The boilers of a tug will be used, and a portable super-heating apparatus be erected on board. In one day a ship, by this plan of disinfecting, can be thoroughly purified, and she will be enabled to come to the city in safety. If this is the case it will be the saving of many thousand dollars to our merchants and shipowners.

Uterine Displacements.

Dr. BANNING'S article, already published, on uterine displacements, has led to a large correspondence, both with our office, and directly with him, as to how patients may secure the benefits of his auxiliaries for their treatment. The subject will be more fully treated upon in subsequent articles of the series. Dr. BANNING has also con-

Cold — the great arrester

of organic transformation — &

also, ^ Antiseptic & destructive

of infection. ~~to recall in connection with cold to~~

I ~~can~~ (remember) well an account of

~~Lieut~~ Maury ~~on~~ ^ ~~person~~

~~Lieut~~ the sudden cessation of cholera

on a ship, the Juscarora, in 1854,

on meeting an iceberg,

Frost always stops autumnal

fevers, & Yellow fever

Cholera only lingers (ramps) thro' a north

bound ~~ship~~ ship keeps along just as fare

green house plants or pet animals,

by artificial heat in doors

Cold is not easily made available because practically as a disinfectant, Manufac. as ice.

Labarraque's liquid,
solution of Chlorinated Soda

Ledoyen's — Solution of Nitrate of Lead

Burnett's — Chloride of Zinc solution

Condy's — Solution of Permang. potass.

Sulphate of Iron, 1 pound in 1 gallon
Chloride of Lime — ditto —
Burnetts liquid 1 pint in 1 gallon.
Labarraque's — 1 floz in a quart
Permang. potass — 1 or 2 drachms in a pint
Carbolic Acid 1 oz in 2 or 3 gallons
Salicylic Acid 1/2 drachm to a pint

(Remarks further on cold as disinfectg — & on rationale of different actions of disinfectants

Recapitulate:

For disinfecting of privies —

we may use Sulphate of iron, ~~Chloride of Lime~~ or chloride of lime (or chloride of calcium) or chloride of Zinc; or in suitable closets or privies — dry earth.

Of Sulphate of iron, a pound to a gallon of water will be a good proportion; let it be well dissolved.

The same proportion of Chloride of lime may be thoroughly mixed in water.

160

Of Chloride of Zinc, Burnetts liquid contains 23 grains in each fl. drachm. — Of that strength, a pint may be put in a gallon of water for use.

N. Y. Board of Health prefer a sol. of 10z. carbol., 8 oz. Sulph. Zinc, 3 gall. water.

1 ℔ 300 or 800

1 gr to 480

1 gr Salicylic acid in ℥j

Water-closets in houses should be thoroughly washed & & used, and, in warm weather, especially if any epidemic prevail, — also disinfected by chloride of Zinc solution, as just mentioned, or Labarraque's chloride of soda, — say a fluid ounce to a quart of water; or solution of permanganate of potassa — one grain to the ounce, or stronger; — heaps of solid or semi-solid filth — as in country privies or camp or hospital latrines, — may be covered with charcoal 2 or 3 inches deep — or quick lime — or in their absence, dry earth.

Drains, Ditches, & Sewers

may be disinfected by sulphate of iron, perchloride of iron, or chloride of lime. A pound of good chloride of lime, ~~of quick~~ will suffice for 1000 gallons of running sewage.

Articles of clothing requiring

disinfection, may be soaked in a weak solution of permanganate of potassium which is not corrosive, or in a weak solution of carbolic acid. Then let it be boiled, or at least plunged into boiling water.

Woolens, & all clothing which

cannot be washed, & bedding, should be exposed for 2 or 3 hours to

a heat of from 200° to 250° F.
For drinking water, permang. potass. sol., 10 gr. in gallon of water after filtering through granular charcoal & boiling it.
The interior of a house & rooms occupied, may be disinfected, first & mainly by ample ventilation, — also by Nitrate of Lead Solution, (1 lb litharge, 7 oz NO5 & 2 gallons water) — & chloride of lime, the latter put in saucers about the rooms. Walls may be whitewashed freshly, — & woodwork washed with dilute Chloride of lime-water, — say 2 oz to the gallon. Carbolic acid sol., 1 oz. to 2 or 3 gallons may be sometimes. An unoccupied house or room may have sulphur burned

in it) — to give off SO_2 —
or Nitric acid poured on
Copper, to make NO_4, —
or, — best of all
Superheated steam (a.n. Bell of Brooklyn)
or heat with stoves for
24 to 48 hours up to 150° F.
Hospital wards having erysipelas or hospital
gangrene — may be disinfected by standing about shallow
vessels containing pure Bromine or a solution of it.
One disinfection, not-
withstanding Dr Moffatts and
Dr Richardsons expectations, — is
a subject yet open for future
experimentation.

Electricity troublesome &
phosphorus dangerous, for it.

= Crude permang. potass will do quite well,

Carbolic acid solutions, from 90 per cent. down, are much more used for disinfecting than the pure solid acid fresh dissolved, — which is proper for the medicinal use of it. Carbolic acid, by the way is not chemically an acid at all — it would be better named carbol.

DISINFECTANTS.

(Concluded from p. 655.)

IF the chloride of calcium spoken of by Eckstein be as efficient as he claims it to be, it ought to be one of the most commonly used disinfectants. So far as I have been able to learn, only the pure form of it is in the market, and this commands a comparatively high price for other than sanitary uses.

PRESENT, — Prof. J. Carson, and Drs. T. Norris, McQuillen, J. G. Hunt, Buckingham, B. H. Coates, Corlies, Holman, and Richardson.

Dr. J. G. HUNT made a verbal communication upon the histological appearances of the omentum, and exhibited some beautifully prepared specimens, stating, however, that he had found them some of the most difficult objects to manipulate he had ever undertaken.

Dr. HUNT also displayed a specimen of a stellate hair, or scale, from an ivy leaf sent to him in some vomited matter from one of our large hospitals, as a great

Enormous quantities of it sufficiently pure for disinfecting purposes are said to be thown away, as a waste product, in all alkali-works; and its utilization would be a great benefit. E. C. C. Stanford, Esq., of England, in 1872, proposed its use, establishing its value by an elaborate series of experiments proving that of all the chlorides it is the most powerful for its price, and is decidedly superior to "*chloralum*." He recommends it in the form of solution containing twenty-five per cent. of the solid salt, and acidified with twelve per cent. of hydrochloric acid. This increases its power, and is a harmless addition. As it does not make a black precipitate with sulphuretted hydrogen, the chloride of calcium is better than copperas for ordinary household use. The solution of Mr. Stanford appears to be a most excellent form of it for many purposes, but for others the solid form is best. Thus, there is always great difficulty in keeping urinals in houses free from offensive odor: this is said to be entirely obviated by putting a lump of chloride of calcium in the urinal; it lasts a long time, as it dissolves very gradually, and keeps the urinal perfectly free from odor.

— over —

When it is further borne in mind that the odor of carbolic acid is most penetrating, permanent, and offensive, that it does not readily dissolve in the various liquids desired to be disinfected, and that it is so terribly poisonous as to have no advantage on such score over the corrosive sublimate, I think it may be well affirmed that when small quantities of the disinfectant are needed, as in cholera cases occurring in private practice, the bichloride is more available than carbolic acid. Moreover, corrosive sublimate actually alters organic compounds, parting with a portion of its chlorine, and being reduced to calomel.

I think, therefore, that for destroying the germs of disease, as in the stools of cholera, corrosive sublimate is preferable to carbolic acid, and is, indeed, on the whole, the best known substance for practical use.

Corrosive sublimate dissolved in Labarraque's solution would, I believe, make the best disinfectant for the purposes now being spoken of,—certainly far more efficacious than carbolic acid, much more manageable, no more poisonous, and cheaper.

It is however a question whether copperas, in satu-

... Not so with copperas: it is antiseptic, but it also decomposes sulphuretted hydrogen, precipitating sulphide of iron; it is decomposed by ammonia, the oxide of iron, a persistent, powerful ozonizing agent being precipitated; it slowly but persistently attacks organic matter about it, oxidizing it and being reduced to a sulphide of iron. As copperas is very cheap, theoretically, it is the most efficient and valuable of the disinfectants, and practical use has shown, its price being considered, that it is the best. The common mistake is in not using it in sufficient quantity. At the ordinary drug-stores it is sold for from seven to fifteen cents a pound; and twenty-five pounds of it seems a great deal to the purchaser. Professor Genth, however, informs me that by the quantity impure copperas can be bought for seven-eighths of a cent a pound; and at this price in time of a cholera epidemic our streets should be watered with its solution.

(3)

of albumen cylinders and ep[illegible] the time of the precursory diarrhœa. If the examination of the urine show negative results, *cholera will not ensue*. The author has had now forty-eight cases in which to establish his discovery as a fact. In no one of these cases has he been deceived in his prognosis. It is very true that in *stadium asphycticum* little or no urine at all can be obtained for testing purposes; yet if catheterization be regularly practised (and it should never be omitted in cholera) enough may be obtained at some time for chemical and microscopical examination. The author does not claim priority in the discovery of albumen in the urine of cholera collapse. Simon and Hermann called attention to this fact in the third decade of the present century. The author's claim consists in the discovery of albumen in greater or less quantity during the stage of the '*diarrhœa premonitoria*.'

"Should an individual in health be suddenly attacked with diarrhœa, even during a cholera epidemic, *and should on examination no albumen be found in the urine*, *cholera will not develop*, not even if the individual be

applicable to ten times as many purposes as carbolic acid, and could eventually be manufactured at one-third the price.—*British Medical Journal*, Dec. 24, 1870.

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Comparative Energy of Antiseptics.—Dr. F. Crace Calvert has performed two series of experiments in order to ascertain the comparative powers of various substances ordinarily used as antiseptics. The first consisted in placing in bottles (not corked) solutions of albumen and flour paste. To these he added various proportions of some of the substances patronized at the present time as antiseptics.

The results of these experiments clearly show that the only true antiseptics are carbolic and cresylic acids; and these results coincide with those obtained by Mr. William Crookes, F.R.S., Dr. Angus Smith, F.R.S., and Dr. Sansom. These two acids continued their action till the albumen solution and paste dried up. The second series had the object of ascertaining which of the undermentioned substances would possess the most active power in destroying such germs, and thus preserving the animal substance from decay. At the bottom of wide-mouthed pint bottles, Dr. Calvert placed a known quantity of each of the antiseptics, and suspended over them by a thread a piece of sound meat; and, by daily examination, it was easily ascertained when the meat became tainted or putrid. The following table gives the results obtained:—

Antiseptics used.	Became tainted.	Putrid.
Permanganate of potash	2 days.	.... 4 days.
Chloralum	2 "	.... 10 "
McDougall's disinfecting powder	12 "	.... 19 "
Chloride of lime.....	14 "	.... 21 "
Tar oil.....	16 "	.... 25 "
Chloride of zinc.....	19 "	.... —
Carbolic disinfecting powder	Did not become tainted, but dried up and became quite hard.	
Carbolic acid.....		
Cresylic acid.....		

British Medical Journal, Dec. 24, 1870.

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Hydrate of Bromal.—The hydrate of bromal, or bromal-hydrate, is the corresponding compound to chloral hydrate, the chlorine being replaced by bromine. Its composition is $C_2 HBr_3 O, 2H_2O$, it being formed by the direct action of bromine upon alcohol.

degeneration which has brought it to the last stage of its existence, when it would either require to be melted down and absorbed, or be thrown off as a foreign substance. The same change occurs in it at an earlier date if through some disease an end be put to the life of the fœtus, and in such a case expulsion of the dead child does not take place until time has been given for the degeneration to occur in the decidua, which leads to its being loosened from the uterine parietes and reduced to the condition of a foreign body. The observation of this phenomenon has led by a beautiful induction to the employment of the simplest, safest, and surest means of bringing on labour, by imitating the process of nature and producing an artificial separation of the membranes from the interior of the uterus in those cases where, to save the life of the child and to lesson the mother's risk, it is found needful to induce the labour prematurely.

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Chloralum.—Dr. STEVENSON read (December 17, 1870) before the Association of Medical Officers of Health, his report on chloralum as an antiseptic and disinfectant. The substance, aluminic chloride, was not new to chemists. It seemed to have no action on sulphuretted hydrogen. It would deodorize some compounds perhaps, because it fixed ammonias and organic ammonias. In its antiseptic properties, it seemed to be like many other mineral salts. It stopped putrefactive change to a great extent, but seemed inferior to carbolic acid. It was difficult to determine whether it had disinfectant powers; probably it had. Dr. Stevenson thought that in any case its expensiveness, as compared with carbolic acid and other disinfectants now in use, would weigh against it. It might be of advantage in the case of dead bodies, where the preservation of color was of importance. —Mr. JOHN GAMGEE had been assured by Dr. Angus Smith and others, that this was almost an untouched subject. He claimed for chloralum a superiority over carbolic acid, on account of its inoffensiveness and harmlessness; and because the strength could be moderated at pleasure. It was

means of the double catheter. The indications for intra-uterine injections were:—1. Retention of the membranes. 2. Retention and decomposition of coagulated blood. 3. In lochiometra. 4. In any form of endometritis. 5. In secondary hemorrhage.—In fact, he said it was customary to use a weak solution of carbolic acid, one part to 400, as an intra-uterine injection, immediately after labor, in all cases, by way of prophylaxis.—*Rundschau*, April 12, 1875.

To Disinfect and Deodorize Excrements.—Dr. Camerers, of Ulm, has tried some experiments with reference to this subject, using for the purpose diluted urine, and as disinfectants, carbolic acid, sulphate of iron, English sulphuric acid, and caustic lime. He has found that the sulphate of iron and the caustic lime alone are capable of preventing the formation of low organisms. He therefore recommends these latter for purposes of disinfection, as the most certain, the cheapest, the most free from danger, and as preserving their properties best when dissolved in water. Two classes of substances act as deodorants of excrements; first, such as fine sand, powdered mould, or clay, etc., which form a coating over the stinking surface; and second, such substances as charcoal, which absorb the offensive gases. He states that a vault with a capacity of 20 cwt. can be rendered perfectly free from smell in the course of twenty-four hours, by scattering about in it a few pounds of pulverized charcoal. The charcoal does not, however, prevent putridity and the formation of low organisms.—*Rundschau*, April 12, 1875.

Progress of Medical Science.

SIGNIFICANCE OF DISTURBED ACTION AND FUNCTIONAL MURMURS OF THE HEART.—Dr. J. R. Leaming read an interesting paper lately before the N. Y. Academy of Medicine, having the above title. He commenced with a review of arguments adduced in a former paper of his, relating to the mechanism of the first sound of the heart. Dr. L. holds that the first sound of the heart is wholly due to vibrations of the chordæ tendinæ of the mitral valve, set in motion by the action of the blood-current. This he regards as the key to the explanation of an important share of the morbid sounds of the heart. These morbid sounds he divides into *valvular* or organic murmurs, and *intra-ventricular* murmurs, which are "more or less functional." The murmur of a valvular lesion is the "bellows" murmur of Laennec, and is a friction sound of blood gushing through a narrowed aperture. The intra-ventricular murmurs, are nearly always due to irregular vibrations in the chordæ tendinæ. Their tone may vary from a soft blowing murmur to harsh sawing, rasping, or filing sounds, and where the vibrations are rapid, the tone becomes distinctly musical. Vegetations or calcifications of the valves projecting into the current of blood may sometimes be thrown into musical vibration, but this is very exceptional, it is claimed, and musical murmurs are almost invariably

Salicylic Acid

ing, as first observed by him in Paris. When a system of sewerage was put in operation in Brooklyn, house owners were earnestly requested, instead of allowing the roof water to flow into the street gutters, to connect the leaders with the sewers, for the purpose, as set forth, of "ventilating the sewers." A little thought will convince any one of the danger of thus delivering disease-laden odors at the very windows of our attic bedrooms. In common with others, I thoughtlessly obeyed the expensive injunction, not thinking of the consequences. Some years afterwards I moved to my present country residence, and carrying out the same idea, connected an untrapped rain water leader with the house sewer pipe. For months a disgusting odor of more or less intensity was complained of by the occupants of an upper room, and for months the cause eluded discovery. It was finally observed that it was only noticed when a certain window was opened. On this clue I made a closer investigation—after exhausting the dead rat and leaky gas pipe theory. It did not take long to locate the trouble. A back current of air that happened just then to be setting through the pipe, projected the noisome steam of sewer gas with considerable force through the upper end of the leader, which happened to be located about two feet below the window in question, and directly under it. Startled at the danger to which the members of my family had been so long exposed, and thoroughly ashamed of my own ignorance and carelessness, I began to reflect that just such an arrangement existed in many houses in Brooklyn, at the special request of the authorities. Perhaps it exists yet; perhaps its palpable impropriety may have long ago induced the necessary change. If not, is it saying too much to denounce it as a most dangerous practice? You who can deal with the subject thoroughly and professionally, will not, I am sure, need more than the foregoing crude remarks from a layman to induce you to give it the attention it may appear to merit.

H. R. WORTHINGTON.

SALICYLIC ACID, THE NEW DISINFECTANT.

Baltimore, May 14th, 1875.

A. N. BELL, M. D., etc.,

Editor of the Sanitarian:

I take pleasure in forwarding you some practical notes on salicylic acid. I was in Leipzig when this body was discovered, and made for Prof. Kolbe almost the very first experiments to prove its disinfecting qualities. Salicylic acid was previously slightly known to the chemists, but the wonderful method of making it from carbolic acid and its powerful disinfecting property were only discovered fifteen months ago. My experiments were subsequently published under the auspices of the Leipzig Medical Board. Sailing thence for America (in May, 1874), I introduced it here, as will be proved by a reference to Prof. N. R. Smith, of this city, and to the Academy of Medicine of Ohio. And my notes of it have been published in the following journals: *The Clinic*, Nov. 7th, 1874; *Baltimore Gazette*, July 10th, 1874; *Medical and Surgical Reporter*, April 17th, 1875; *Virginia Medical Monthly*, May, 1875. In the instances mentioned it was used in a watery solution varying in strength from one part in twenty-five to one in three hundred, with perfect success. Since then its introduction into American therapeutics has led the way to another field of investigation, namely, its application to household uses. If crude salicylic acid (a salmon-colored, glistening powder) be sprinkled upon the floor and walls of a mouldy cellar, the patches of vegetable decomposition—designated as Leptothrix—will disappear after a few applications at intervals of 12 hours each. Moreover, the musty, disagreeable odor—at times the carrier of infection—arising therefrom ceases at once. If thrown upon cobwebs, these are often broken entirely down or remain hanging only by a few shreds, and the spiders either do not return or will afterwards be seen dead underneath. It is also fatal to cockroaches. A little of the powder, cast upon places frequented by them in the evening, will be found in the morning to contain many dead ones, and a few repetitions wholly disperses them. Thrown into boxes or barrels filled with garbage, it prevents decomposition and bad odors. To disinfect sinks, wash them morning and evening with a solution of salicylic acid, 1 part to water 100 parts. Two or three pounds of the crude powder thrown into large privies or cesspools thoroughly eradicates all foul odors. In the sick chamber, with infectious diseases, it is invaluable; used in powder or by the atomizer in solution. It effectually destroys organic germs, and so prevents propagation. Its use in barns and stables is also recommended, and the solution forms a most agreeable wash to swab the mouths and nostrils of horses. As regards the use of salicylic acid for disinfecting and preserving the dead, no experiments, as far as I am aware, have been reported; but, judging from its wonderful action in preventing the putrefaction of anatomical preparations submerged in a watery solution of 1 part to 150, by Prof. Ludwig, of Leipzig, it may be confidently employed. Cloths saturated with a solution of this character should be wrapped about the body, or the solution may be injected hypodermically. Undertakers will also doubtless find it useful for coffins.

It is also effectual for the destruction of parasites on plants.

Your obedient servant,

GEO. HALSTED BOYLAND, M. A., M. D.,
Laureate of the Leipzig Medical Faculty, etc.

THE PUBLIC HEALTH.

Mortality per 1,000 *inhabitants annually, from all causes, and certain special causes.*

POPULATION AND REGISTRATION AT MOST RECENT ESTIMATES AND DATES.	Deaths under 5 years.	Total No. of Deaths from all causes.	Per 1,000.	By Violence.	Small Pox.	Diphtheria.	Scarlatina.	Measles.	Croup.	Whooping Cough.	Typhoid Fever.	Typhus Fever.	Puerperal Diseases.	Diarrhœal Diseases.	Consumption.	Lung Diseases, excluding Consumption.
New York, 1,060,800—4 weeks en'g April 24	926	2296	28.70	89	89	140	52	6	57	34	22	4	41	67	295	361
Philadelphia 775,000—4 weeks end'g May 1.	569	1456	24 42	40	5	47	121		24	6	20		20	9	219	128
Brooklyn, 450,000—4 week ending May 1..	316	774	22.36	17	12	63	19		38	4	3	3	21	8	122	98
St. Louis, 450,000—4 weeks ending May 1..	189	438	12 65	10	32	7	38		2		3		6	6	59	76
Chicago, 400,000—4 weeks ending April 24..	341	588	19.11	12	2	5	12	15	13	2	8		7	33	57	97
Boston, 375,000—4 weeks ending May 1.....	194	586	20.31	24		13	39	1	10	1	10		11	7	93	72
Baltimore, 350,000—4 weeks ending May 1..	185	472	17.53	13		6	37	1	1	6	7		2	6	85	35
Cincinnati, 260,000—4 weeks ending May 1.	120	303	15.15	12	4	3	8		1	7	5		2	7	52	48
New Orleans, 210,000—5 weeks end'g May 2	105	522	21.09	19	62	4	2		6	3	5		1	18	65	46
San Francisco, 210,000—month of February.	89	310	17.71	13	1	7	3	2	3	1	14		2	2	51	41
Washington, 150,000—4 weeks end'g May 1.	134	311	26 95	12		3	1	3	6	4	4		2	6	61	53
Pittsburg, 140,00 —4 weeks ending May 1.	89	207	19.22	7	5	2	15	1	1	2	4		4	6	39	35
Milwaukee, 100,000—month of April.....	113	159	19.08	2		1	8		1	4		2	4	2	10	23
Providence, 100,000—month of April.....	32	138	16.56	5		3	9				1		6	2	20	19
Rochester, 80,000—month of April.....	87	196	16.90	4		2	44		5	1	2				18	36
Richmond, 65,000—4 weeks ending May 4..	32	106	21.20	10		1					1		1	3	21	10
New Haven, 60,000—month ending April 30	25	89	17.80	3	1	1	6		3		6				25	6
Charleston, 50,000—4 weeks ending April 24	10	107	27.82	2			3	2	1		1				19	10
Toledo, 50,000—month of April.....	13	46	11.04	4		1			1		2		2		6	5
Memphis, 45,000—.....																
Paterson, 38,000—month of April.....	44	97	30.63	6		7	4		2	3	1		1		16	15
Dayton, 35,000—month of April.....	10	45	15.42	1	1				1						12	5
Nashville, 25,868—.....																
Wheeling, 27,000—month of April.....	11	42	18.66			1	6			1	3			1	4	7
Elmira, 21,000—month of April.....	2	29	17.04	1			1		1		2				5	8
Knoxville, 8,000—.....																

NEW YORK, May 14th, 1875.

The 2,268 deaths in this city during the last four weeks of April, complete a necrological record of one of the coldest periods which has found any public registry of effects of unusually low and fluctuating temperature on the life and health of the people. With a mean temperature for the entire six months but little above freezing point, even for the four weeks ending May 1st, at 42.4 degrees Fahr., and with unusual fluctuations and fierce winds, it is not remarkable that diseases of the respiratory organs have continued to be more fatal than in past years. Bronchitis and pnuemonia were charged with 359 deaths in the four weeks, and with 1,867 in the six months, and phthisis was charged with 381 and 1.599 in these respective periods. The gradual decrease of the rate of mortality from the pulmonary maladies in April, is in evidence of the absence of any specially epidemic febrile factor in the production of this prevalent cause of mortality.

In April (4 weeks ending May 1st), 175 of the 2,268 deaths were caused by diphtheria (9.9 per cent. of total), 57 by croup, and 51 by scarlatina, while from measles there were only 6 deaths. The total number of deaths by these four diseases foots up about the usual sum or ratio which they have held in former years for the same period, and it may reasonably be said that diphtheria has in some sense supplanted scarlatina and croup, at least, and that the most scrupulous physicians frequently certify that fatal diphtheritic diseases supervene upon their cases of scarlatina and croup.

The general state of the public health in the city is as favorable as is usual at this season, excepting only the influences of the protracted cold weather. Even the puerperal maladies which were becoming too frequently fatal, and in the month of March were charged with some 70 deaths, decreased to less than 50 in April. The public hospitals were nearly free from puerperal fever, but the total mortality in the public institutions amounted to 438 in an average constant population of about 15,000. The total number of deaths of infants under a year old, was 488, and of children under 5 years of age, there were 950 deaths in an estimated child population at that age, of about 125,000. The death rate in this child population was equal to 180.2 in the 1,000, and the death rate for the total population of the city (1,060,000), was equivalent to 27.73 in 1,000, annually.

ELISHA HARRIS, M. D., *Registrar.*

It shall be allowed, 1. To skin the animal, and to remove the bristles, and to use skin or bristles; 2. To smelt the fat and to use it; 3. The use of the parts that are needed for manufacturing soap and glue; 4. The working off the whole by chemical processes.

During the year 1875, in the small duchy of Brunswick there were made 109,027 examinations of hogs, and among them there were found to be 37 only diseased—16 trichinous.—HESSE.

—**Carbolic Acid as a Disinfectant.**—Dr. C. B. White, President of the State Board of Health of Louisiana, in a communication to the editor of the *New Orleans Medical and Surgical Journal*, March number, takes exception to the action of the physicians of New Orleans, condemning carbolic acid (published in the September number of that journal), noticed in March number of THE SANITARIAN.

—The marked localization and the very limited range of action of the cause of yellow fever, Dr. White remarks, are universally recognized facts. Reasoning from the method and range of action, and mode of propagation of yellow fever, its poisonous cause is evidently not gaseous in its nature. It seems to attach itself to the soil, to walls, and probably to surfaces in general. If it be a germ, either vegetable or animal, it seems to be low-lying, propagating from centres along surfaces, equally in all directions, against the wind as freely as with air-currents. . . The period of incubation in most persons is four days, and the poison doubtless has existed in more or less force for an indefinite period preceding the precise moment at which the incubation of the disease began.

To completely destroy the poisonous cause, and to arrest the spread of the disease, disinfection must, both in theory and practice, be applied to every infected portion of the whole suspected locality. . . The impossibility of complete disinfection of all surfaces in infected localities, under houses, etc., is evident, and the expression "thoroughly disinfected" is therefore merely relative, denoting the nearest attainable approximation to perfect disinfection.

Perfection in mode of disinfection being impossible, total and immediate annihilation of the yellow fever poison is not expected, but its propagation is rendered less rapid and its march impeded. . . The gathered facts, as at present understood, give a result in favor of the control of yellow fever by the use of the coal-tar acids. . . The so-called crude carbolic acid used for disinfection has been each year, and several times each year, submitted to chemical analysis, and has been announced by Dr. Perry to contain amounts of acids, carbolic and cresylic, never less than eighteen per cent., usually twenty to twenty-five per cent. Besides these it contains other empyreumatic acids, stated by the latest experimenters to be more energetically disinfectant than pure carbolic acid. . . The closing paragraph of p. 419 of the physicians' report quotes with approbation the experiments of Dr. McDougall on vaccine virus, who says: "It is surely plain that the destructive action of carbolic acid on *variolous* matter and other *zymotic* poisons must be null." To this Dr. White goes on to remark: "It is well known that agents quickly injurious or even destructive of life to one class of beings are borne with impunity by another class, or may even serve to support its life. No results of experiments upon

variolous matter, yellow fever, measles, scarlatina, or any other zymotic poison, are offered in evidence of the truth of Dr. McDougall's assertion, and, in the absence of facts, the statement must pass as a piece of unscientific, marvelous assumption on the part of Dr. McDougall.

Carbolic acid has never been used by the Board of Health to disinfect small-pox cases. In 1869, in an epidemic of small-pox in San Francisco, it was thoroughly and scientifically tried, and found to have no value as a disinfectant against that disease. The worthlessness of carbolic acid as a destroyer of variolous poison being well known, it has never been used for that purpose here. . . If carbolic acid by actual contact kills animal or vegetable growths, its disinfectant action is permanent as to them, but of course will not hinder the multiplication of organisms which have escaped its effect. The paragraph as a whole confounds the idea and action of deodorants and disinfectants. Carbolic acid has no retroactive effect, is not directly or properly a deodorant, but indirectly becomes one by hindering putrefactive processes and the formation of sulphur compounds.

Professor Lewis remarks of "the use, or rather abuse of carbolic acid," that in 1867, "*It had no effect whatever.*"—On page 13 of the Report of the Board of Health for 1867, is the following paragraph from the official report of Professor Lewis, then health officer of the Third District. "The number of houses disinfected of yellow fever from the middle of August to November 1st, was about three hundred. . . Every house is a boarding house, and many were filled to overflowing with strangers. These houses were not only fumigated with sulphur, and disinfected with sulphate of iron in solution, but were pumped from top to bottom with carbolic acid, which impregnated the atmosphere for some distance off. This was repeated as often as new cases occurred." . . The principle of this disinfection, however, not being clearly understood at the time, and the disinfection being effected in no portion of the city with a promptitude and thoroughness at all comparable to that manifested by Dr. Lewis, similar results were not elsewhere attained, and the Professor, as is shown by remarks in the paper now under consideration, has thereby been led to doubt the conclusions legitimately drawn from his own thorough, as the word was then understood, and energetic work.

The inference from the experience of 1875—that the use of carbolic acid disinfection does not prevent the spread of yellow-fever, because, after breaking out in one place, it has done so in other localities—before such conclusion can be considered a necessary one, the questions of the indigenous or exotic nature of yellow fever, and the portability or non-portability of its cause must be settled. . .

To destroy yellow fever, or limit its spread by disinfection, would probably be a matter difficult of execution, even if all the factors of the experiment were known and valued. Owing to our ignorance at the present time, the difficulties surrounding the experiment are correspondingly great. As, however, all known cases are recorded, mapped, and investigated, even though mistakes are made, it is hoped, if the process be continued sufficiently long, that a result conformable to truth will be at length evolved.

THYMOL—A NEW ANTISEPTIC.—Dr. L. Lewin sends a communication to the *Centralblatt für Med. Wissen.*, No. 21, 1875, on the subject of thymol, a benzole occurring in white, aromatic crystals, soluble in hot water in the proportion of 1 to 1000, and having in solution a neutral reaction.

A comparison instituted between thymol and salicylic and carbolic acids, as to their relative effect in retarding fermentation, resulted in placing the former at the head of the list, it showing twice as great anti-fermentative effect as carbolic acid, and four times as great as salicylic. Similar results were shown in mixing the thymol solution with putrid matters, this substance showing marked antiseptic properties.

Although thymol itself is expensive, yet it acts in so dilute a solution as to render it in fact cheaper than either carbolic or salicylic acid.

Dr. Lewin promises further particulars in regard to the new disinfectant, with which he is experimenting extensively.

X.

MEDICAL TIMES

A WEEKLY JOURNAL OF

MEDICAL AND SURGICAL SCIENCE.

The Philadelphia Medical Times is an independent journal, devoted to no ends or interests whatever but those common to all who cultivate the science of medicine. Its columns are open to all those who wish to express their views on any subject coming within its legitimate sphere.

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Carbolic Acid.

Abridged Report in Comptes Rendus de l'Académie des Sciences, of March 6th, 1871, by Messieurs Nélaton, Laugier, and Payen, on Experiments made at the Paris Morgue, by M. DEVERGIE.

The following fact will prove the efficacy of this Antiseptic under circumstances where others believed the most efficient had failed :—"During the heat of summer, "when putrefying corpses in the Morgue continually emit a quantity of noxious "gases that cannot be removed by ventilation, or destroyed by Chlorine, or Bleach-"ing Powder, we decided to prevent their production by trying to destroy the "vitality of the germs of putrefaction, and thus prevent decomposition itself. We "effected this by dissolving 1 litre of No. 5 Carbolic Acid (*Calvert's*) in a reser-"voir holding 1,900 litres of water, and irrigating the bodies with the Solution "thus made, putrefaction was completely stopped, and disinfection was even "obtained after reducing the quantity of Acid by one half. M. DEVERGIE points "out that water containing $\frac{1}{4000}$th part of No. 5 Carbolic Acid proved sufficient "during the intense heat of last summer to disinfect the dead-house without aid "of any shaft, when six or seven bodies were lying there."

In summing up they say :—"Carbolic Acid seems well adapted for the disinfec-"tion of rooms which have been occupied by persons suffering from infectious "diseases ; therefore we recommend its use, in a crystallised state, or as a liquid, "after having been dissolved in 20 or 30 times its weight in water, by sprinkling "it on the floors, pavements, and stair cases during the stay of patients in rooms, "and for a few days after their departure."

Carbolic Acid

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Applied Report in Comptes Rendus de l'Académie des Sciences of March 6th, 1871, by Messieurs Sélatan, Langlois and Peyen, on Experiments made at the Asile Sainte, by M. DEVERGIE.

The following fact will prove the efficacy of this Antiseptic under circumstances which are believed the most efficient and fatal :—During the heat of summer, when putrefying corpses in the Morgue constantly emit a quantity of noxious and danger ous miasmata removed by ventilation, or destroyed by Chlorine, or Bleaching Powder, we decided to prevent their production by trying to destroy the vitality of the germs of putrefaction, and thus prevent decomposition itself. We effected this by dissolving 1 litre of No. 5 Carbolic Acid (Calvert's) in a vessel holding 1,500 litres of water, and injecting the bodies with the Solution. The subsequent putrefaction was completely stopped, and distinction was soon obtained after reducing the quantity of Acid by one half. M. Devergie points out that water containing only th part of No. 5 Carbolic Acid proved sufficient for clearing the intense heat of last summer to distinct the dead-room without any offensive smell, when six or seven bodies were lying there."

In conclusion they say :—"Carbolic Acid seems well adapted for the disinfection of rooms which have been occupied by persons suffering from infectious diseases; therefore we recommend it, in a crystallized state, or a liquid, after having been dissolved in 20 or 30 times its weight in water, to sprinkle on the floors, pavements, and slab cases during the stay of patients in rooms, and for a few days after their departure."

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The testimony of Prof. Runkle so nearly agrees with our own experience, that we copy and endorse his note.—*Boston Daily Evening Transcript.*

We feel sure that the adoption of this simple Ventilator will not only add vastly to the comfort of the community, but also increase its health. A large number of our leading citizens have already adopted this method, and there is but one voice relative to it—that of unqualified praise.—*N. Y. Daily Register.*

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remedial measures, and in grave cases as giving the patient many additional chances of life.

In support of my own opinion and practice I have an opportunity of adducing the valuable testimony of Dr. C. R. Agnew, in the following letter from him :

"New York, *Oct.* 14, 1874.

"Wm. Henry Thayer, M. D. :

"*My Dear Doctor*—I must answer briefly and from memory the questions you propound regarding my experience in treating cases of pneumonia in the open air. At the breaking out of the late war I took charge of the State Volunteer Hospital, New York, and had about 120 beds in the north building of the New York Hospital filled with promiscuous cases of those who had become ill *in transitu* from receiving camps to the seat of war. * * * Among the pneumonic cases were several cases of double pneumonia, marked by very distressing, threatening, and intractable dyspnœa. They were treated as I had been taught to treat such cases by Swett, Alonzo Clark, Camman, and my other teachers, but the dyspnœa remained a most distressing symptom, accompanied by exhausting insomnolence. I ventilated the wards as well as I could, and separated the cases as much as possible, but without beneficial result.

"Finally, I adopted the expedient of carrying the patients on litters into the open air and placing them at the south side of the hospital building, where nothing could obstruct the freest circulation of the atmosphere. The litters were all provided with good thick hair mattresses and enough of fleecy blankets to protect the patients. I adjusted to each litter a spirit-lamp and funnel, so that a current of warm air could be made at will to play gently upon the feet of the patient, when his temperature was low or the day unusually cool. I sent an attendant to watch by one or two litters, provided with a parasol, with which to shield the patients occasionally from the sun. I sent the litters out in the early morning, and sometimes kept them out till after dark.

"The effect upon the condition of the patients was invariably favorable—there was marked relief of the dyspnœa within half an hour after the removal from the wards—and I firmly believe that I saved some cases of pneumonia that I otherwise should have lost; this was especially true of some cases of double pneumonia following measles in the adult. I invariably noticed that the recovery was quicker—the resolution went on with astonishing rapidity—and that there was a more vigorous play of the recuperative forces. I had similar experience with fever cases. Indeed I followed the plan of carrying my sickest patients out of doors, and leaving the convalescents to take care of themselves.

"I ought to say that this practice extended through the summer and autumn and well into the winter.

"Ever sincerely yours,

"C. R. Agnew."

Wherever we have the deadly influence of carbonic acid in the sickroom, we have also an accumulation of organic matters which

by fever, which he attributed to exposure in walking in Greenwood Cemetery on the evening before. On the evening of the 13th the characteristic symptoms of pneumonia appeared. I first saw him on the 14th. He was sitting up in bed, unable to lie down from pain in the left hypochondrium ; he coughed much, with expectoration of viscid, rusty sputa ; had bronchial respiration, bronchophony and dullness on percussion over the left back and side, from the middle of scapula to base of chest ; he had no appetite; his tongue had a thick, white pasty coat; pulse, 130 ; respiration, 44; temperature, 103.

In the night of the 16th, hepatization of the right lower lobe took place, with great aggravation of all the symptoms, increased dyspnœa and debility and lividity of the extremities. On the 18th the expectoration consisted of an abundant sanious fluid. Convalescence began on the 20th. On the 21st the returning crepitus was heard in both backs. On the 25th he took solid food.

The case was very grave when the pneumonia became double, and the patient's aspect was so bad on that morning that a neighboring physician, who was called in before I arrived, would not advise any remedies, as he considered him dying and past relief. The lividity of his nails continued very marked for two or three days. But persistent nourishment, active stimulation, free use of carbonate of ammonia, exchanged for the oil of turpentine when the sputa became watery and bloody, quinine, counter-irritation, and the careful and thorough removal of carbonic acid from the air, brought him through. Although the weather was cool, so that we had a fire in the grate, two windows were kept constantly wide open, and an outer door, on the opposite side of the room, much of the time, and a current secured through the room, and across the bed. This was persisted in day and night, and in all weathers, including a cold rain storm ; and of all the agents in his treatment I considered the careful removal of the vitiated air the most important.

In four days from the initiatory chill the second lung was hepatized, in five days more returning crepitus was found, in four more he took solid food, and in five more both lower lobes were found in nearly normal condition.

The other case referred to is that of a lady, 60 years of age, whom I treated in April, 1874, with double pneumonia, followed by diphtheria, involving the entire mouth and pharynx, which latter relapsed and was complicated with acute nephritis, characterized with albuminuria and œdema of lower extremities. Under a series of a affections of so grave a character, a woman of 60 might well be expected to succumb. But she recovered completely—a result which I should not have dared to hope for, had not a good current of air been maintained through her room by means of open windows and doors, day and night, and in all weathers, the temperature being raised by a fire.

In four other cases of simple pneumonia, treated last Spring, the recovery was remarkably rapid under similar circumstances.

I need not multiply instances; but in all acute affections I have always regarded the means employed for a constant and thorough removal of vitiated air from the sick room as the most important of all

Over

deaf, the blind, the maimed, the idiotic and the insane, it is scarcely thought to be obligatory, in a public or personal sense, to prevent through purely mundane instrumentalities, any or all of these evils from ever more afflicting our race. The biologist and sanitarian see the subject in a wholly different light. All animate forms of structure, and all its qualities and variations, are held to be the outcomes, and the outcomes only, of natural and immutable law. When we abide by the law the outcome is good; when we do not it is bad.—Dr. J. R. Black,—*American Public Health Association*, 1874.—

It is not safe to reason from the well to the sick, to infer that the sick can tolerate an atmosphere that the well are often accustomed to. It is true that thousands of people continue to live, and without serious sickness for a time, in rooms largely charged with carbonic acid gas. In a condition of ordinary vigor the system may resist the deleterious influence for a long time, or become gradually accustomed to a lower vitality, or eventually develop some chronic affection. But the proportion of carbonic acid in the atmosphere that one in ordinary health could bear will be sufficient to aggravate materially the severity of an acute disease.

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Dear Sir,

Allow me to call your attention to my Patent Ventilator now in operation in the Reading Room of the "Franklin Institute", 7th St. above Chestnut; and also in the Provost's Lecture Room in the new building of the University of Pennsylvania, West Phila.

It is giving entire satisfaction -

It secures purity of air, and gives increased efficiency to the heater.

I hope you will call and see it before the close of the present cold weather -

Yours Respectfully

Geo. R. Barker

from Dr Kirkbride's Reports
1875.

tilating, and furnishing the North Fisher Ward and putting in its gas and water fixtures.

The average number of free patients receiving the benefit of the hospital, was much larger than last year, and the amount expended on this class in 1874 was $22,980 56.

Heating, Ventilation, and Construction of Hospitals. — The last report contained a detailed account of the heating, ventilating, and other arrangements of the north Fisher ward, then recently completed; but sufficient time had not elapsed to speak with entire confidence of the practical working of these important parts of this addition to our accommodations. It is now gratifying to be able to state that, thus far, everything has proved eminently satisfactory. The heating and ventilation seem to be all that we could desire, and while these subjects, so intimately connected that they ought to be regarded as one, continue to furnish matter for scientific and professional discussion nearly everywhere, our additional observations here only tend to confirm the conclusions, which the experience of this institution led to many years since, and in connection with which, nothing has occurred to make us desire any essential change. In view of the lamentable failures in regard to the heating and ventilating of buildings that frequently occur, it is a very natural subject for inquiry, why such results should happen in one place, while in others there is found nothing to complain of. Every one acknowledges that the most expensive buildings, and the

costliest fixtures and arrangements are not always the best, and yet it must be conceded that the failures in the matter to which reference has just been made, come, most frequently, from an unwillingness to expend money enough to secure a thoroughly efficient arrangement. What is here called economy is a false one; it is really extravagance, for it does not effect the object in view, and is sure to lead to new experiments and larger expenditures, if not to other failures. In the matter of heat, the failure generally comes from abortive attempts to get more out of the fuel than is in it; and in that of ventilation, from a want of appreciation that all ventilation is loss of heat, and from an unwillingness to use enough of the heat obtained, to secure it efficiently.

What is mainly necessary to secure success in heating and ventilation, is the recognition of a few well-established principles. Among these may be regarded as especially important, insisting on the use of steam or hot water as the agent for these purposes, of an abundance of radiating surface for both heat and ventilation, a bountiful supply of pure air at a moderate temperature, direct flues, a willingness to use all the heat that is necessary for the most perfect ventilation, either directly or indirectly, and to feel that it is really economy to do this, no matter what may be the cost, a belief that all ventilation to be worthy of the name must be forced, and that a forced ventilation is just as necessary in summer as in winter, in one season as in another, and by night as much as by day.

It is quite possible to expect too much from any system of ventilation. There are certain causes of unpleasant odors that no system of ventilation can prevent acting at limited distances, and to remove which a certain time is required, but the steady change of air, the substitution of pure for impure air, is readily obtained, and with absolute certainty, independent of doors and windows, the force or direction of the wind, or thermometric or hygrometric conditions of the atmosphere.

These discussions in regard to heating and ventilation, very naturally and properly, are connected with those in reference to construction. If this were always the case, there would not be seen, as has been witnessed even recently, large and costly structures with their cellar walls up, and the buildings fairly in progress, without the mode of heating and ventilation having been decided on. It is scarcely necessary to say, that not a spade should be put into the ground, before the plans for both heating and ventilation are thoroughly matured, and that many of the interior arrangements can hardly fail to be, to a greater or less extent, dependent on them. The cellar really is one of the most important parts of any building—and no building can with propriety be without a cellar—for in it are to be placed the most essential arrangements in regard to heating and ventilation. It is difficult to conceive of any efficient system of heating and ventilation that dispenses with a cellar or basement and an attic. In the former should be all the main air-passages, the radiating fixtures, the commencement of the flues, and the power that regulates the movement

of the air, and makes the whole plan effective; and in the latter, should be the arrangements for carrying off the impure air from the wards below. Where heating only is desired, it is a very simple matter, but it is generally just as unhealthy as it is simple. So any ventilation that is not forced, really cannot be regarded as worthy of the name. Ventilation may be secured by the direct use of heat, or by a fan, the latter being now generally preferred by those who have paid most attention to the subject. The first cost of the engine and fan is, in most instances, what prevents its universal adoption. Its subsequent use is quite as economical as any other arrangement, that can at all compare with it in efficiency. Fuel must be burnt in any case, to give the power, and what is required to furnish the power to drive the fan, is certainly no more than is necessary, to secure the same amount of ventilation by means of a heated chimney stack. To have proper ventilation, the temperature of the air that is introduced must be properly regulated, according to the seasons, and the fan may be made to determine, with certainty, the amount that is to be used.

At certain seasons it is well to get all the advantage we can from a natural ventilation, but it is a most unreliable agency. The openings for the ingress and egress of air, that are always seen in the walls or ceilings, when without a controlling power, are comparatively useless. Indeed they often seem to be simply a means of making careless observers labor under the delusion, that a proper ventilation is going on, while, in reality, the air is about as likely to

be moving in the wrong as the right direction, or, what is often quite as annoying, to be going in neither direction. Medical men, above all others, have reason to estimate highly the efforts of nature, but in the matter of the ventilation of hospitals, the unassisted efforts of nature are lamentably inefficient. The fact that forced ventilation—especially by the use of fans—is adopted much more in hospitals for the insane, than in any other class of hospitals, or in other public buildings, has been recently recognized and dwelt upon, by an able writer in one of our oldest and best medical journals. This may fairly be accepted, as not a little complimentary to those controlling these institutions, and so thoroughly do sound principles in regard to heating and ventilation prevail among those interested in the care of the insane, that it is safe to say that no hospital of this kind is likely hereafter to be erected, without ample provision being made for its forced ventilation. In Pennsylvania, as elsewhere, this is the case, and the fan is the mode already adopted in nearly every hospital in the Commonwealth.

As the attempt to secure a reliable heating and ventilating apparatus without a sufficient expenditure of money, as previously suggested, is liable to lead to disappointment and unsatisfactory results, so the tendency of the day, which seems to be to encourage the erection of what are called cheap structures, and those that are temporary in their character, it is feared, will not be found to meet the expectations of their projectors. Much of this tendency is unquestionably due to the success, which

attended the use of temporary wooden buildings during the war of the rebellion; but as has been well said, by high authority, it is not fair to attribute the success of these hospitals, either to their cheap or their temporary character. They were simply a necessity of the times. Located in the most healthful country sites that could be found, with the very best material for patients, they had too, very generally, the advantage of thorough and complete control, by highly cultivated officers, prepared to bring to their tasks, all the skill and science which the times afforded. Between them, therefore, and ordinary city hospitals there is little that can fairly be compared. So far as ordinary hospitals for the sick, and for the use of the army and navy are concerned, it is quite safe to leave the discussion of the subject to the able men who are now taking an active interest in it. The subject is here referred to, only because it has recently been suggested in influential quarters, that the same system of inexpensive and even temporary wooden structures should, in certain localities and for some classes of the insane, be substituted for the complete hospitals, recommended by the Association of Superintendents, and that we should ask, not for what is best, but for what is only better than something that is much worse. It is quite safe for any one who enters upon this discussion, to begin by insisting upon what may safely be regarded as well-settled axioms—that no hospital too good, or too complete in its arrangements, for the care and treatment of the insane, has yet been provided; and that the best-constructed, best-ar-

ranged, and best-managed hospital is always cheapest in the end. There are examples all over the country that prove conclusively, that a small expenditure in the erection of a hospital is no evidence of its having been provided economically. From the first day of their occupation the expenditures for repairs, alterations, and improvements on such buildings often begin, and, once started, they seem to be never ending; while at the close of a dozen years, the amount thus expended, added to the original outlay, will make them take rank with the most expensive hospitals.

While saying this, most emphatically, I would not less earnestly protest against all extravagance, all useless ornamentation, and everything that is not likely to be of use to the patients. Whatever will be of any real value to the patients, the hospital should possess, almost without regard to cost. This is a wise and liberal economy, while leaving a hospital without anything that is known to be useful to the patients may be extravagance, although much less money is expended than for the complete institution.

It is not intended here to arraign any one for expending too much money in providing accommodations for the insane, but it is obvious to those who have most earnestly looked into the subject, that there is just now a tendency, in some influential quarters, to go to the other extreme—to take as models, buildings certainly not of a high order of hospital architecture, and to limit the cost of future structures to what has been expended on these,

without inquiring sufficiently, whether the diminished cost is not counterbalanced by, and is not in a direct ratio to, the increased inefficiency. It must be remembered, too, that additions can always be made at much less—probably about one-half—the cost per patient, of the original hospital, and that if the patients are lodged in associated dormitories—which is not to be recommended—instead of single rooms, the expense is still more diminished. The first cost of a hospital does not always indicate whether it is an economical or an extravagant structure. As said before, there seems to be a growing willingness to accept what will answer, rather than to insist on what is best. It is to be hoped that those in authority, and the people, the source of all authority, will only be satisfied with what is best. How to procure all this, at least cost, is a fair problem for study and solution.

It may fairly be doubted whether it is the best mode of proceeding, when about to build a hospital, to say exactly how much it shall cost, for this can scarcely be done even when the most particular contracts are made, and may result in bad work and imperfect arrangements, in order to come within the prescribed limit. It is more likely to secure the object in view, to insist on the plan on which it shall be built, and what fixtures and arrangements it shall have, and then to see that everything is done in the best manner, but, at the same time, with the strictest economy.

So in regard to the support of hospitals for the insane, it will be a sad day for these institutions,

and still sadder for the patients in them, when the rivalry of hospitals and their officers shall be, rather to discover for how little their inmates can be kept, than to secure what is best, and most thoroughly promotes the great objects for which they were established.

It has been said that one-storied buildings are most desirable for all hospitals, but I presume that few who are familiar with the subject, will deny that the second story is commonly preferred by patients and others, on account of its more extended views and its being brighter and airier, as well as more private. As the cellar and roof are both necessary for the one-storied buildings, the second story involves, comparatively, but a small proportion of the aggregate cost, and in any ordinary hospital there are always patients who have no objection to going up and down a single flight of stairs, or even an additional one. The modes recently adopted for making hospital buildings fireproof, involve so little additional expense — certainly not more than twenty-five per cent.—and where there are similarly guarded and detached stairways, secure so complete a separation between the stories, that there can be no objection to one ward being directly over the other. Access to second stories is easy or difficult, very much according to the construction of the stairways. In hospitals they should always have risers of very moderate height, few steps without a platform, hand-rails, and be made of materials that do not become slippery from use.

There is only one class of patients in hospitals for the insane for whom one-storied buildings are very desirable, but this arises from their mental rather than their physical condition, and not on account of a second story being less healthful.

In regard to the propriety of making hospitals temporary in their character, it may well be doubted whether the experience of any well-managed institution fairly justifies an affirmative conclusion.

Hospitals, more than other buildings, require the utmost daily vigilance to keep them in the condition in which they should always be found. This can be done, however, and when it is, there is undoubted evidence that a hospital may be in as good sanitary condition, at the end of a century, as it was at the close of the first decade of its existence. Where it is very different from this, there is fair reason to suspect that there has, at some time, been a deficiency of sanitary vigilance and the best management. Recent reliable statistics of hospitals for the sick, where all crowding—one of the greatest sources of danger—has been carefully avoided, seem to prove this conclusively.

The number of cases—and there are such, now and then, in hospitals for the insane, as in those for the ordinary sick—where a strictly temporary structure is desirable, is so small—probably not more than one or two per cent. of the cases treated—that this provision is hardly worth taking into account, when preparing plans for a building.

Our climate requires that hospital buildings should be well constructed, and made so as to protect the

patients from great atmospheric changes, and yet without any interference with their perfect ventilation. Temporary structures will hardly do this. When once provided, these temporary buildings and arrangements are pretty sure to continue to be used long after the period for which they were originally intended, on account of the expense of providing new ones.

Permanent hospitals, which have so many advantages, may, whenever desired, be made quite equal to new ones, by a process comparatively inexpensive, and which has the value of being tested by experience, having years ago, been successfully adopted in one of the oldest institutions in the country. The walls, exterior and interior, the divisions between the stories, the cellars and roofs, all the costly heating, ventilating, water, and gas arrangements require no material changes. Let all the plastering of the walls and ceilings be taken off, and replaced by the best hard finish, and all the floors renewed by the use of thoroughly seasoned narrow yellow pine boards, secret nailed, and of extra thickness, and the work is completed.

This done, if it was rightly planned in the beginning, we have a hospital equal to any new one, and at very little cost; so little that the process may be repeated, whenever it is deemed desirable, although it can hardly be necessary but at long intervals.

In regard to wooden structures, the greatly increased danger of fire is sufficient to justify their rejection, and to this may be added their rapid de-

terioration and their being specially favorable as harbors for vermin.

Past and Present of the Insane. What has been done and what is yet required.—With the best motives and with a view of exciting an active and general interest in the Insane, the statements of facts in regard to their condition, are often so highly colored, that in distant places, the impression has become common, that with all the enlightened progress of the age, Pennsylvania has been doing little for this most unfortunate class of her citizens. This impression does not give a correct idea of what has been, or is now being done. It is hardly necessary at this day, to go back to the times before any hospitals were provided, or to describe the condition of the insane at that period. Nothing told in history is sadder, or excites more surprise than the truthful relations of their treatment, during a period claiming a high degree of civilization. The great ameliorations that have taken place, and especially since 1794, are among the brightest jewels in the diadem of Christian philanthropy, and offer the greatest encouragement for continued labor in the same direction.

Without referring to detailed statements of the early history of the insane in this commonwealth, it is enough now to state, that the first patient ever placed under hospital treatment in America, was admitted into the Pennsylvania Hospital, in the city of Philadelphia, on the 11th of February, 1752. For the next eighty-eight years, the increase of ac-

We have just seen in an English paper an abstract of meteorological observations made by Mr. Isaac Fletcher, M. P., among these Cumberland mountains. For nearly thirty years he has kept rain gauges at various stations, and the record of some of them for the year 1872 is astounding. The rainfall at different points ranges from about 91 inches up to almost 244 inches. At four stations it was above 175 inches. The highest result was obtained at a place known as "the Stye," at an elevation of 1,077 feet, in one of the wildest passes of the region, between the lakes of Derwentwater and Wastwater. Mr. Fletcher remarks: "The amount registered on the Stye — nearly 244 inches — is marvellous, and is greatly in excess of any previous record. In 1866, 224.56 inches were recorded. So far as has yet been ascertained, the Stye is the wettest spot in Europe, and, except in tropical countries, the quantities I have quoted represent the two greatest annual falls of rain that have ever been recorded."

But we presume that to many of our readers these figures convey no definite idea of the actual amount of rain that falls at this "wettest spot in Europe." A few other facts will serve as a basis of comparison, and also to show what a capricious phenomenon rain is — the most capricious, in fact, of all meteorological phenomena, both in respect to its frequency and the amount that falls in a given time. There are regions where it never rains — as on the coast of Peru, in the African Sahara, and the Desert of Cobi in Asia — and there are others, as in Patagonia, where it rains almost every day. At most places in our latitude, if an inch falls in a day, it is a pretty heavy rain; but among the Highlands of Scotland, and in the English "Lake District," of which we have been speaking, from 5 to 7 inches not unfrequently fall in a day. On the Isle of Skye, in December, 1863, 12.5 inches fell in 13 hours. At Joyeuse, in France, 31.17 inches fell in 24 hours; at Geneva, 30 inches in 24 hours; at Gibraltar, 33 inches in 26 hours.

As regards the *annual* rainfall, the most remarkable is on the Khasia Hills, in India, where it averages 600 inches, about 500 of which fall in seven months of the year. We do not know of any other place where the average rises even to 300 inches, though at two points on the Ghauts Mountains in India it is 254 and 263 inches. At Madras it is 45 inches; at Bombay 75 inches.

It will be seen that the rainfall on the Stye, in Cumberland, approximates to that in the

struct the glass capillary tube with the frail little bulb upon the end — these came from the glass-blower — but we loaded them with mercury, and adapted a scale for registration, which are the most interesting processes. In placing mercury in a glass tube out of contact with air, we have two substances combined together, both of which expand by heat. If the glass tube and the mercury expanded in the same proportion, our thermometer-making would be a failure, as the mercury inside the tube would keep pace with the vessel that held it, and consequently its level would remain unaltered, no matter how hot or cold it might be. Fortunately there is a difference in expansibility between the glass bulb and tube, and the mercury, that of the latter being the greatest; therefore it rises and falls as the heat is increased or diminished.

The dilatability or expansive power of mercury is greater than that of glass in the proportion of nearly 20 to 1, consequently the capacity of the bulb and tube will be less enlarged than the volume of mercury contained in them, in the proportion of nearly 20 to 1; thus we obtain a wide range of level, amply sufficient to adapt a scale and affix to it delicate markings. In order however to reach this desirable end, we must have the tube through which the mercury rises, *much smaller* in diameter than the bulb which holds it, as the smaller the proportion of the one to the other the greater will be the space through which the mercury will oscillate. A given increment of temperature will produce a definite increase in volume in the mercury, and this increase of volume will fill a greater space in the tube, in proportion to the smallness of the bore of the tube compared with the capacity of the bulb. With the glass tube properly supplied with mercury, the instrument would be worthless without a graduated scale which will show numerically the changes which occur; but with the glass bulb and tube, the mercury and scale, we have a thermometer of the simplest form in use.

The first thermometers ever constructed were what are known as *air* thermometers, air being used instead of mercury; but they were necessarily of inconvenient size; and from the extreme delicacy of their indications, and their limited range, they were easily supplanted by the mercurial instrument. Mercury has singular advantages over all other substances for thermometric purposes. It is highly sensitive to changes of temperature, contracting and dilating quickly; it freezes at a low and boils

wettest tropical districts. The average in the west of Great Britain and Ireland, in the vicinity of high hills, is from 80 to 150 inches, while away from the hills it is only from 30 to 45 inches, and in the east of England not more than 20 to 28 inches. In France it averages 30 inches; in the level parts of Germany, 20 inches; while in some parts of Russia it falls as low as 15 inches.

In this country it averages, in the Southern States, from 50 to 65 inches, though at some points, as at Athens, Ga., it is only 36 inches. In the Northern States it ranges from about 27 to 45 inches. On the Pacific coast it is 22 inches at San Francisco, but increases as we go northward, being 47 inches at Fort Vancouver and 90 inches at Sitka, in Alaska.

Boston J

VOLUME VIII.

Familiar Science.

THERMOMETERS.

THERE is one philosophical instrument which has become so "popular" that we meet with it erywhere; in the dwellings of the poor as well the rich, and among classes of people who ittle taste or inclination to investigate

THE highest inhabited spot in the world is said to be the Buddhist cloister of Hanle (Thibet), where twenty priests live, at the enormous height of 16,500 feet. There are other cloisters at a nearly equal height, which are inhabited all the year round, in the province of Guari Khorsum, upon the banks of Lakes Monsaraour and Bakous. In these equatorial regions one can live easily for ten or twelve days at an altitude of 18,000 feet, but not for a longer time. In August, 1855, the brothers Schlagintweit, exploring the glaciers of the Ibi Gamin in Thibet, encamped for ten days at these elevations, which are rarely visited by a human being. At first they suffered a good deal at 17,000 feet, but gradually became accustomed to 19,000. In 1856, they ascended as high as 24,339—the highest altitude man has ever reached on land. The highest inhabited point in America is the post house of Ape, in Peru, 14,367 feet. Potosi, in Bolivia, which has a population of 100,000, is 13,323 feet high. The highest land in America is the Aconcagua, in Chili, 22,422 feet. But this is only a baby peak compared with the Gaurisankar (Himalaya), which rises 29,003 feet.

lock P. M., by the late Major-Gene-
orge G. Meade, the contract for its
n being $45,530, the furnishing, &c.,
g the total cost about $50,000. The
was chartered on the 11th day of No-
, 1871, and six acres of ground were
by a lady and gentleman at Forty-
and Greenway avenue, near Darby
on which the building was erected.
nded as a home for orphan and des-
hite boys of all creeds, from 3 to 12
age, and will be used in connection
e Lincoln Institution, to which the
will be transferred after attaining
er age.

tructure is of stone, of gray color,
Leiperville quarries; there is a cel-
r the whole building, and a loft in
ansard roof, thus securing the best
tion. It is heated throughout with
and the partitions and walls are all
p to the second floor, as a preventive
all vermin. On the first floor, on
e of the hall, is a play room, main
ay, wash and bath rooms; on the
side a dining room, off which is the
n's dining room, pantry for washing
, bread, grocery, and other closets;

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Altitude -

In balloon ascents)

Glaisher & Coxwell and others have repeatedly reached the height of over 20000 feet; one party actually 37000 feet.

Several times they have, in such attempts narrowly escaped death, from cold & rarefaction of the air.

In 1875, Tissandier & two other Scientific men went up in France to about 20000 feet; Tissandier alone came down alive. It has been suggested that the others may have been asphyxiated by the escape of gas from the balloon.

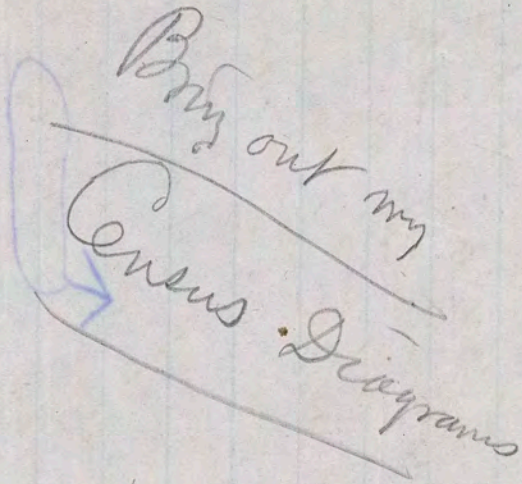
Climates

Hot 30° N. & S. temp to 55° — cold to poles

Brûlant	torrid	moyenne	25° C	= 77° F
chaud	warm		20	68°
Doux	mild		15	59°
tempéré	temperate		10	50°
froid	cold		5	41°
très froid	frigid		0	32°
glacé	polar			0°

Hot & Warm climates —

Syria — Arabia — S. Africa — Egypt &c —
N. America between gulf of California &
Isthmus of Panama — S. America, Columbia,
Ecuador, Paraguay, Antilles —
In these regions, —
, Summer — & winter of rain —; or
November to Feb. — tropical winter, like spring of Europe
Feb to May — dry season —
May to July — variable, with storms (ouragans)
July to November — rainy season — warm —
(Hippocrates notions effects of climates on races on natural
monstrosities vol. fully — Esprit des Lois)


Bring out my
Census Diagrams

FOREST METEOROLOGY.

In the early part of the summer season, so lately ended, there were fears of widespread forest fires, growing out of some disasters at that time, which seemed to be but the forerunners of greater ones to come during the long drought then anticipated. But the drought did not come to this section of the country. The showers of July put out the early fires, and the soaking rains of August so saturated the woods that the careless fire of the hunter or the other kind of "tramp," the half-smothered match or burning gun-wad cast among dead leaves, were deprived of their power to do mischief. Our fast-fading timber forests have thus escaped the perils of one more summer, but there is still a survival of the inquiry, raised for the hundreth time, into the relation between the forests and the rainfall of a country. It has long been held by scientists and by foresters that the clearing of the soil has the effect of diminishing the rainfall, and that the trees of large growth serve as valuable condensers of the vapor in the winds, which often but for them would pass over the earth without depositing rain. This widespread theory has of late years been put to the test on a large scale in Europe and elsewhere, with results of considerable interest. From the third annual report of the "Forest and Meteorological Stations of Germany," we learn, in a recent foreign journal of science, that this system of inquiry into the influence of forests on weather and climate now includes eighteen stations, covering a region extending over 7 degrees of latitude and 5 of longitude, the stations being at elevations ranging from 10 to 3051 feet above the sea. The thermometric observations, taken from three sets of instruments—one placed in the forests, one in the crowns of the trees, and the third in open spaces outside the woods—"show, in every case, a *lower* air temperature inside the wood than on the outside." The average difference (1.3 deg.) may seem small and uninfluential; but it is not so. Whatever lowers the temperature of the air may be considered as a cause of rain. Whenever the winds or rain-clouds which pass over head are so *saturated* with moisture that their capacity to hold more is fully exhausted, it is plain that a very slight reduction of their temperature will suffice to condense their vapor into water and discharge it in the gentle shower. The German observations, therefore, while they are far from complete, are of decided value, and, in establishing the uniformly chilling influence of woodland upon the superincumbent air, show that the former possesses some rain-producing agency of no trifling consequence. The experiments of Fautrat, as given in Professor Baird's Annual Science Record, show that, in fourteen months, 10 inches more of rain fell on a pine forest, and 5 inches more on an oak and beech forest, than on the adjoining open fields, and 3.2 more fell on a pine forest than on a sandy plain about two miles distant.

Taking these experiments (which are, perhaps, the most exact and definite known to us), in connection with many observations of a general nature made in various parts of the globe by sagacious men, they point to highly important results. Many years ago, Sir John Herschel, when on Table Mountain, at the Cape of Good Hope, found that the rain-bearing winds from the sea, while depositing little or no moisture on the treeless side of the mountain, yielded copious showers on the timbered side—a fact which he explained by the influence of the cool tree tops in condensing the vapor. Many like phenomena have since been recorded by travellers; the mean annual rainfall of deforested regions has undergone perceptible diminution; tree-culture has been successfully tried on a large scale with the object of increasing the precipitation of arid places, and a large mass of data adduced, affording strong presumptive proof that forests have a direct effect on weather and climate.

When we add to these incomplete, but not wholly inconclusive observations this certain fact, that forests detain and store the torrential rains, and gradually dispense the water, which would run off from denuded land before it could be absorbed, the conservation and cultivation of trees appear well worthy of earnest individual and State care and encouragement. Especially is this the case in the trans-Mississippi States, in large areas within and north of the Ohio valley, and in the belt of country running from West Virginia to Northern New York, in all of which the total rainfall for the three summer months is less than twelve inches, or only one inch a week.

Dr. H Hartshorne Nov9
East Penn Street

R

VE CENTS A WEEK

ing improvement, and the movement of the ice, the location of currents and the limit of the fast ice at several points have been noted.

A partial examination was made of the wreck of the "Ironside," formerly a United States vessel, which burned at the League Island wharf and now lies at the lower end of Horseshoe shoals. The wreck was much silted and little but projecting pieces could be found by the diver.

It is proposed during the ensuing fiscal year to continue work upon the Mifflin bar, to recommence Bulkhead shoals, and to begin the improvement of the river below Bridesburg as may be found necessary. (This is in addition to the works at Schooner ledge and Cherry Island flats, which have been specially provided for.)

It is also proposed to continue the tidal observations, connecting the gauges by line of levels, for the purpose of ascertaining the slope of the river and the velocity of the tidal wave between certain points, and the study of other phenomenal facts, in order to combine the work at various points into a consistent and comprehensive scheme for the improvement of the river as a unit. For continuing these works and for including such others as may require attention, an appropriation of $150,000 will be required for the fiscal year ending June 30, 1881. Also $20,000 for improving the Delaware river between Trenton and Bridesburg; $60,000 for improvements at Schooner ledge, and $100,000 for improvements at Cherry Island flats.

The South American War.

PANAMA, Aug. 26.—The allied armies have not moved, notwithstanding the repeated assertions of their commanders that now everything was ready for that much dreaded march across the desert. It is now generally believed that no march will even be attempted, as the difficulties of provisioning so large a force as would be required to retake the disputed coast are entirely beyond the power of the poorly organized allied commissariat. Even water would have to be provided, as any streams crossed, such as the River Loa and others carry to the sea a brackish water, to drink which is a sure producer of dysentery and other diseases. To preserve lines of communications extending over so many leagues of desert is evidently beyond the powers of any of the leaders who have as yet appeared.

The Huascar has made another visit to the south coast, destroying launches in several places. Peruvian reports state that the Peruvian ram chased the Chilian transport Lamar, which, to avoid capture, ran ashore. This is denounced by the Chilians. The Union departed from Arica recently on secret mission, but private letters from Lima say that the object is to intercept steamers through the Straits of Magellan laden with arms for Chili.

An English steamer is expected with a full cargo of war material from Belgium and her capture would be another addition to the rich prizes which have lately fallen into Peruvian hands.

It is expected, also, that the Union will stop the Pacific Steam Navigation Company's vessels, and those of the Kosmos line, and, if contraband of war is found on board, will take them as prizes.

The blockade of Iquique has at last been abandoned by the Chilian fleet, which is now concentrated at Antofogasta.

Several vessels have already gone to Iquique to load, but it is quite possible the Chilians may return at any moment, destroy the Peruvian vessels there and the launches in the port.

The nitrate establishments cannot resume work for a long time, on account of the scarcity of laborers.

The Luxor, a German steamer, held on charge of violating neutrality laws, has been condemned by a court of Lima as a lawful prize. It is not likely that the judgment will stand investigation, according to the terms of international law and usage.

The excitement in Chili, on receipt of the news of the capture of Rimac, was intense.

The opposition party made it the occasion for the fiercest onslaught upon the Government, on which the populace, impatient under the inactivity of the Government, moved with great zeal in most riotous demonstrations. Great crowds gathered in the principal plaza, and shouted "Down with the Ministers!" "Death to the Arancanian!" and similar imprecations.

A strong body of military was called out and after a time the mob dispersed, only to reassemble the following night in the Alameda with increased numbers and with organized plans of operation. The iron seats were used for barricades, and the soldiers sent to disperse the crowd were saluted with volleys of stones, bottles and some pistol shots. The troops, who were cavalry, fired three volleys from their carbines and then charged the dense mass, cutting and slashing right and left, but rather with a view of clearing the streets than of slaying the people.

FOREST CULTURE AS A PROPHYLACTIC TO MIASMATIC DISEASES (*Pacific Medical and Surgical Journal*, August, 1875).—Dr. W. P. Gibbons, in an able paper on the above subject, comes to the following conclusions. That forest trees in sufficient numbers will absorb, from deep as well as from superficial strata, a sufficient quantity of water to establish regular subterranean currents, and that whatever miasm may be combined with or held in solution by the water will thus be carried off, or have its toxic properties in whole or in part neutralized; that the water thus exhaled will be diffused through the atmosphere in such quantity as to be returned in great part to the surface-soil by precipitation; that the high summer temperature may thus be so modified as to reduce the nocturnal heat below 60°; that the causes thus operating to prevent vegetable fermentation, or to dissipate miasm if developed, would protect the valley from regular visitations of paludal fevers; that the modification of climate thus induced would, under ordinary circumstances, insure average crops of grain in localities which are now dependent either on unusually wet seasons or on artificial irrigation; and that, while immediate benefits would thus be conferred upon the farmer by extensive tree-planting, the remuneration would be cumulative, not only in the regularly increasing value of his timber, but in the prospective reclamation, by natural process, without absolute expense, of land which is now utterly useless.

states that as the tincture of arnica is used by the peasantry in all injuries, he has very often observed this inflammation of the skin, which closely resembles the erythema after bites from insects, after the use of even the diluted tincture.—*New York Medical Journal.*

TREATMENT OF NEURALGIA IN THE MAMMARY GLAND.—In these cases Prof. Broca has returned to the treatment which was employed by Récamier. Whether the tumor is appreciable or not, as soon as there is pain or sensitiveness he has recourse to methodical compression. Récamier superposed a series of disks of amadou, applied closely, and held in place by a very tight bandage, and this bandage was only renewed at long intervals.—*Revue de Thérap. Med.-Chir.; New York Medical Journal.*

GLEANINGS FROM OUR EXCHANGES.

OVARIOTOMY.—In a paper read before the Suffolk District Medical Society, Dr. James R. Chadwick describes the removal of a unilocular ovarian cyst. The abdominal walls were found to be very thick; an incision four inches long was made in the median line, a Wells clamp was applied to the pedicle, and the wound closed with silk sutures. Two gallons of fluid were in the cyst. The total weight of the tumor was eighteen

the cadets of which have been sent for training to the continental schools of forestry. The present volume is the outcome of the first five years' results obtained at the stations in Bavaria established under the superintendence of Prof. Ebermayer, of the Forest School of Aschaffenburg.

Many of the statements in the book depend on the observations of only three years, or even of a single year, but our author states his conviction that the main features of the subject can be elicited with sufficient accuracy for each station in a period of observation as short as that mentioned, and that the instrument can then with advantage be removed to a fresh station.

It must be remembered that the difficulties of the observations are very exceptional, as the mounting a ladder to read a thermometer in the top of a tree is not an agreeable duty to perform in all weathers, and so too great a tax must not be laid upon the officials to whom the instruments are entrusted.

The subjects investigated in the open country are, speaking generally, temperature in shade and sun, earth temperature, hygrometry, rainfall and evaporation. To these are added, in the forest, observations made in the head of the tree and on the temperature of the heart of the tree itself at various heights.

The first stations were established in 1867, and the total number in Bavaria is seven, distributed over the country. To these is added one in Bohemia on the property of a nobleman. The outfit of each station cost about £40, and the yearly cost of maintenance is one-half that sum. Some of the apparatus used deserves special notice, especially the vaporimeters for open water surfaces and for soil, and the arrangements for determining the amount of infiltrated water.

The subject is, comparatively speaking, so new and the variety of observations so great that the author for the most part contents himself with simply enumerating his results without attempting to deal with the subject as a whole. We shall therefore confine our remarks to an account of some of the more important subjects touched upon in the volume.

Earth Temperature comes first, as being the most important element for vegetable life. It is found at the various depths, 0–4 feet, to be lower, to the extent of twenty-one per cent., on the mean of the year, in the forest than in the open, and this is pre-eminently the case in spring and summer, while in winter the difference is scarcely traceable. This shows us that the effect of clearings is mainly felt in summer, and that it is greater the warmer is the climate. Diurnal range is felt only to the depth of three feet, and it is materially diminished by the presence of forest. The annual range of temperature is less in the forest than outside it, but the periods of the two phenomena do not agree very closely.

The effect of wood on Air Temperature is similar to that just described, but the extent of the influence is only about half that exerted on earth temperature: the differences between the temperature above and underground thereby produced are of great importance as affecting the aëration of the soil, and thereby the nutrition of the roots. The observations as regards height show furthermore that the temperature rises with the height at least up to the level of thirty or forty feet. When we remember that the diurnal range is reduced by the presence of wood we see how an alternating vertical circulation, like that assigned as a cause for land and sea breezes, is set on foot, the existence of which, as our author amusingly states, may be proved by watching the smoke of a cigar.

The tendency of forests is found to be to moderate the extremes of temperature, and so to render the climate less severe. This is a direct contradiction to the popular idea that the cutting away of our forests has made our climate less extreme than it used to be.

The observations on Tree Temperature are very valuable, as by them we are able to determine far more simply than by any other means the total amount of heat required by each tree for its development. These experiments also throw great light on the causes which regulate the flow of the sap.

Becquerel's idea that trees warm the air is distinctly controverted by the results under discussion, which show that the temperature of the trees themselves is generally below that of the air.

In the winter the trees are colder than the soil, and in summer warmer: hence we see that the main seat of activity is in the roots in winter and in the branches in summer.

As concerns Vapour Prof. Ebermayer finds that the existence of timber produces no difference in the absolute quantity present in the air, but that owing to the depression of temperature the Fraction of Saturation is raised by the forest.

face of it, suggesting not "interesting," but utterly ludicrous "ideas of spirit intercourse;" yet we are to believe it, or else indicate exactly how our doubts are divided between Mr. Owen himself (who may have been somewhat misled by his evidence), the Bachs, father and son, the spiritualist friends who instructed M. Bach how to become "a writing medium," and so on.

Again, we are to believe all such stories unless we are prepared with an explanation of every circumstance. It seems to me that it would be as reasonable for a person who had witnessed some ingenious conjuring tricks to insist that they should be regarded as supernatural, unless his hearers were prepared to explain the exact way in which they had been managed. Indeed, the stress laid by the superstitious on narratives such as those related by Mr. Owen, is altogether unwarrantable in the presence of all that is known about the nature and the laws of evidence. In works like Mr. Owen's the author is witness, judge, and advocate (especially advocate) in one. Those who do not agree with him have not only no power of cross-examining, but they commonly have neither time nor inclination to obtain specific evidence on their side of the question. It requires indeed some considerable degree of faith in the supernatural to undertake the deliberate examination of the evidence adduced for ghost stories,—by which I mean, not the study of the story as related, but the actual questioning of the persons concerned, as well as an examination of the scene and all the circumstances of the event. Thus I cannot see any force in the following remarks by Professor Wallace:—"How is such evidence as this," he says, speaking of one of Owen's stories, "refuted or explained away? Scores, and even hundreds of equally attested facts are on record, but no attempt is made to explain them. They are simply ignored, and in many cases admitted to be inexplicable. Yet this is not quite satisfactory, as any reader of Mr. Owen's book will be inclined to admit. *Punch* once made a Yankee debtor say—

> This debt I have repudiated long ago;
> 'Tis therefore settled. Yet this Britisher
> Keeps for repayment worriting me still!

So our philosophers declare that they have long ago decided these ghost stories to be all delusions; *therefore* they need only be ignored; and they feel much 'worrited,' that fresh evidence should be adduced, and fresh converts made, some of whom are so unreasonable as to ask for a new trial, on the ground that the former verdict was contrary to the evidence."

All this affords excellent reason why the "converts" should not be ridiculed for their belief; but something more to the purpose must be urged before "the philosophers" can be expected to devote very much of their time to the inquiry suggested. It ought to be shown that the well-being of the human race is to some important degree concerned in the matter, whereas the trivial nature of all ghostly conduct hitherto recorded is admitted even by "converts." It ought to be observed that the principles of scientific research can be applied to this inquiry; whereas before spirits were in vogue the contrary was absolutely the case, while it is scarcely going too far to say that even the behaviour of spirits is to be tested only by "converts," and in the dark. It ought, lastly, to be shown that the "scores and even hundreds" of well-attested facts, admittedly singular, and even, let us say, admittedly inexplicable, are not more in number than the singular and *seemingly* inexplicable facts likely to occur (by mere casualty) among the millions of millions of events which are continually occurring; but this is very far from having been as yet demonstrated; on the contrary, when we consider the scores and hundreds, and even thousands of facts which, though they have been explained, yet seemed for awhile (and might have remained for ever) inexplicable, the wonder rather is that not a few books like Mr. Owen's, but whole libraries of books, have not been filled with the records of even more singular and inexplicable events.

From The Academy.

THE PHYSICAL EFFECTS OF FOREST UPON ATMOSPHERE AND SOIL.*

"THE welfare and the progress of a country depend to a certain extent on the amount of forest which it contains." Such a statement appears strange enough to us here at home, but its truth has at last been recognized at the India Office, by the foundation of a forest department,

* *Die physikalischen Einwirkungen des Waldes auf Luft und Boden, und seine klimatologische und hygienische Bedeutung, begründet durch die Beobachtungen der Förstl. Meteorologischen Stationen in Bayern.* Dr. Ernst Ebermayer. Aschaffenburg: Krebs.

Evaporation from a free water surface is about sixty-four per cent. less in the forest than in the open, and morever it is far more ruled by the motion of the air than by the temperature. Hence we see the importance to young plantations which are likely to suffer from drought of leaving belts of trees to shelter them. Anything which breaks the force of the wind retains moisture in the soil.

The evaporation from the soil is, however, a very different thing from that from a free water surface, and in considering it we arrive at the valuable result that the brushwood, leaves, &c., which cover the ground exert quite as great an influence in retarding it as the forest itself.

It is found that for every hundred cubic inches of water evaporated from the soil, in the open, the ground in a forest, cleared of brushwood, &c., gives off only thirty-eight, and the uncleared ground, in its natural condition, give off only fifteen cubic inches. Hence we see how immediately the water supply depends on the wood, and the fact confirms the old observation that in new and thriving settlements the springs dry up in proportion as the land is cleared.

It is a self-evident proposition that plants require rain, but Hellriegel has shown how much they require: according to him every pound of barley requires the supply of seven hundred lbs. of water during the period it is in the ground. Trees require a different quantity from corn, and in addition they have a very great effect in draining the land, for it is found that land from off which the timber has been entirely felled often becomes swampy, and only dries again when the new plantations spring up. This fact shows us that trees exert a constant demand on the moisture of the soil, so that over-drainage of the ground must seriously affect their growth.

It is then a most important matter to determine the effect of forest on moisture. Prof. Ebermayer's experiments lead him to the view that the idea of the effect usually attributed to wood in increasing rainfall is not fully justified, and that much which has been held to be due to the timber in a country is really much more due to the contour of the country itself. The influence of forests on rain is however much greater among mountains than in the plains; it is also greater in hot climates than in cold, and in summer than in winter.

The actual amount of rain which is collected on the ground in a forest is about three quarters of that which falls on the cleared land outside. The quantity in defect does not all remain in the tree tops, as much runs down the stem; but it is found that the proportion retained by the foliage differs with the different character of the wood; thus it is greater with conifers (Nadelholz) than with leaf trees (Laubholz), and of all trees Scotch fir retains the most.

The usual proportion between evaporation from a free water surface and rainfall on the same surface during the year is that the former rather exceeds the latter. The evaporation from the ground is very different from that from a water surface, and so, as regards the soil of a wood, the proportion above mentioned is reversed, for the diminution of evaporation is less than that of rainfall. If however the wood be cleared of brushwood, leaves, &c., the rate of evaporation from the soil is seriously increased, and in fact in such a case the amount of water stored up in the ground against periods of drought falls below that in open land, owing to the fact that so much of the rain is intercepted before it reaches the ground.

The work concludes with some remarks on ozone, and on the hygienic effects of forests, and with some practical applications of the results obtained to the explanation of the causes of certain diseases which are very destructive to young fir plantations. Copious tables are appended, with an atlas of graphical representations of the results.

Our hearty thanks are due to Prof. Ebermayer for the work, which contains, as will be seen, a mass of carefully collected and important data of the highest value to the scientific meteorologist and botanist, as well as to the practical forester and the landscape gardener.

× Eucalyptus of Australia, thought to be anti-malarious, by rapid drainage of soil. Southern pine-trees also drain well.

General Lefroy, the Governor of Bermuda, well known as a scientific man during his long service at the War Office, has published a very admirable report on the sanitary condition of Bermuda, compiled with the special objects of gathering information respecting the recent visits of yellow fever to that colony, and of studying the general effects of the climate on the European and African races. These meet, we may observe, at Bermuda under fairer conditions than in any other British possession, the climate being temperate without being cold for nearly half the year, though of tropical heat during the summer. Thus favoured, however, Bermuda, even independently of the dreaded epidemic, stands at present lower as to health results than the actually tropical stations of our troops in the Windward and Leeward Islands, though much higher than Jamaica. General Lefroy's report does not appear to settle the important question as to whether the fever which ravaged the garrison in 1843, 1853, 1856, and 1864 can be traced to direct importation; but it is abundantly shown that the absence of all proper drainage precautions, added to certain cases of overcrowding, had established before each recurrence conditions abundantly favourable to the propagation of the malady when once fairly started. General Lefroy, in summing up his results, gives it as his opinion that to protect the islands effectually the sanitary measures urgently needed should be supplemented by a moderate system of quarantine, to be enforced, however, only during the hot or dangerous months. With regard to the general effect of the climate, it is apparent that, though relaxing to the young, it is very favourable to the advanced in years. The report gives a total of persons dying at ages over seventy-five years, which General Lefroy remarks "could probably not be matched by any district of 12,000 souls in England. It would have gladdened the late Sir George Lewis, however, to learn that the alleged cases of centenarians, of which four were at first reported to the governor, proved on close inquiry to be as mythical as many others nearer home, the oldest, a white lady, having died when still wanting three months of the hundred years. Pall Mall.

That which is most pure in man is most divine: — "Blessed are the pure in heart, for they shall see God." That which is most tender in God is most human: — "Like as a father pitieth his children, so the Lord pitieth them that fear Him."

These two rays of light meet in Christ. Do they neutralize each other as light beams sometimes do? Does the divine weaken the human? the pure diminish the tender? The reverse. It is sin that hardens and dehumanizes us. So, then, with what confidence we may cast ourselves on a sinless Saviour, "holy and yet harmless!" Thoughts by the Way.

"LOST WITH ALL HANDS."

"Lost, with all hands, at sea."
The Christmas sun shines down
On the headlands that frown o'er the harbour wide,
On the cottages, thick on the long quay side,
On the roofs of the busy town.

"Lost, with all hands, at sea."
The dread words sound like a wail,
The song of the waits, and the clash of the bells,
Ring like death-bed dirges, or funeral knells,
In the pauses of the gale.

Never a home so poor,
But it brightens for good Yule-tide.
Never a heart too sad or too lone,
But the holy Christmas mirth 'twill own,
And his welcome will provide.

Where the sea-coal fire leaps,
On the fisherman's quiet hearth,
The Yule log lies, for his hand to heave,
When he hastes to his bride on Christmas Eve,
In the flush of his strength and mirth.

High on the little shelf
The tall Yule candle stands,
For the ship is due ere the Christmas night,
And it waits, to be duly set alight
By the coming father's hands.

Long has the widow spared
Her pittance for warmth and bread.
That her sailor boy, when he home returns
May joy, that her fire so brightly burns,
Her board is so amply spread.

The sharp reef moans and moans.
The foam on the sand lies hoar;
The "sea-dog" flickers across the sky,
The north wind whistles, shrill and high,
'Mid the breakers' ominous roar.

Out on the great pier-head,
The grey-haired sailors stand,
While the black clouds pile away in the west,
And the spray flies free from the billows' crest,
Ere they dash on the hollow sand.

Never a sail to be seen,
On the long grim tossing swell,
Only drifting wreckage of canvass and spar,
That sweep with the waves o'er the harbour bar,
Their terrible tale to tell.

Did a vision of Christmas pass
Before the drowning eyes,
When 'mid rent of rigging and crash of mast,
The brave ship, smote by the mighty blast,
Went down 'neath the pitiless skies?

No Christmas joy I ween,
On the rock-bound coast may be.
Put token and custom of Yule away,
While widows and orphans weep and pray
For the "hands, lost out at sea."

All The Year Round.

By Dr. J. Randolph Ham
Dover, N. H.

greater elevations and in higher latitudes, than are now suitable to the vine.

Sir Charles Lyell says there is no doubt that, in the United States of North America, the rapid clearing of the land has rendered the winters less severe and the summers less hot; or, in other words, the extreme temperatures of January and July have been observed from year to year to approach somewhat nearer to each other. Whether in this country, or in France, the mean temperature has been raised, seems to him by no means as yet decided; but he has no doubt the climate has become less excessive.

The decrease of the forests of the United States is at the rate of seven millions of acres annually; and the demand for lumber increases twenty-five per cent. per annum.

Few people have any idea of the immense value of the wood which is used for purposes generally considered comparatively unimportant.

The fences of the United States are now valued at one billion eight hundred millions of dollars; and it costs ninety-eight millions of dollars annually to keep them in repair.

The railroads of the United States use one hundred and fifty millions of ties annually.

In 1871, ten thousand acres of forest land were stripped of their timber to supply fuel for the single city of Chicago.

In twenty years scarcely anything will be left of the vast forests of Wisconsin, Michigan and Minnesota.

If, in our investigation of the temperature records of this country, since its settlement, we find the temperature to have raised step by step with the encroachments of civilization upon the primeval forests, we must admit the influence of this agency in bringing about a third climatic change.

However much we may be inclined to accept these theories of man's agency in modifying climate, it seems to me that we should not rest here; but that we should examine the actual record of the rainfall and temperature in the United States, and, making allowance for such errors as might naturally creep into the observations made at different stations, we should accept their result, even if all our speculations should be proved groundless.

The earliest observations of the rainfall, known to have been made within the limits of the United States, do not go back further than the year 1738; in the eighteenth century there were nine stations in these limits, which, with the single exception of Charleston, S. C., furnished no results till after the year 1772.

Records of the rainfall do not become continuous at any one station till after the commencement of the present century.

After the New York system of observations was inaugurated, in 1825, the records became more numerous.

In 1836, the United States government commenced a system of observations of the rainfall, under the direction of the medical department, which, like the New York system, is continued to

the present time, and constitutes a most important contribution to our knowledge of this branch of meteorology. At the present time these observations are published by the Patent Office, in connection with the Smithsonian Institution.

These observations are made in accordance with circulars from the Surgeon-General's office by the medical officers of the army at the military posts of the United States.

The abstracts of all the records of observations of the rainfall which have been made from the early settlement of this country down to the close of the year 1866, so far as they could be obtained, were collected by Professor Henry, and published by the Smithsonian Institution in 1872. These records, deficient and imperfect as they are, constitute the only reliable data that we have for determining whether the annual rainfall is increasing or diminishing, stationary, or of a periodic character.

To exhibit the nature of the fluctuations of the rainfall more distinctly, we will unite the observations into groups formed of stations where the annual rainfall appears subject to the same laws:

Group 1 is composed of stations on the Atlantic sea-board from Maine to Virginia.

Group 2 covers the State of New York, including Amherst, Mass.; Hanover, N. H.; Burlington, Vt.; and Montreal and Toronto, Canada.

Group 3 is formed by Forts Ripley, Snelling, Dubuque, Milwaukie, Muscatine and Ottawa.

Group 4 covers the Ohio Valley, from Pittsburg, Pa., westward, and includes Eastern Missouri.

Group 5 is formed by Forts Gibson, Washita, Towson, Smith, and Washington, Arkansas.

Group 6 includes New Orleans, Baton Rouge, Huntsville, Greenboro' and Fort Barancas.

Group 7 comprises the southern coast from Virginia to Florida.

Group 8 is the Pacific coast.

Results from groups 1, 2 and 4, are considered by Professor Henry to be trustworthy, from the number of stations and the length of time the observations cover; but the remaining ones can only be taken for rough approximations on account of the insufficiency of stations.

The tabular mean results are exhibited in this report of Professor Henry by diagrams for the more reliable groups.

The irregularities in the successive annual amounts of rain are found to be very great, yet they do not obliterate the indication of conformity to general laws. The diagrams showing the fluctuations in the annual rainfall in groups 1 and 2, viz: on the Atlantic sea-board from Maine to Virginia, and in the State of New York and some adjacent localities in New England and in Canada, distinctly indicate an increase of rain, on the average, since 1818, and also show a certain tendency to an arrangement of groups of years of drought, followed by unusually wet years. The fluctuations of rain in these two groups are evidently similar, and they might have been combined into one.

The only remaining group which may be considered trustworthy is group 4, which covers the

Ohio Valley, from Pittsburg westward, and the eastern part of the State of Missouri, and here we find the fluctuations in the rainfall to be of quite a different character. This section of our country does not present any progressive movement nor periodic change in the annual fluctuation; there are more remarkable droughts and wet seasons, however, than in groups 1 and 2.

In group 7, which is the Atlantic coast, from Virginia to Florida, there seems to be a periodic change; the rainfall seems to have been constantly on the decrease. Here, however, the number of stations is not sufficient to make it reliable.

The remaining groups are too limited in stations to be analyzed.

There is an apparent increase of the rainfall in New England, in the middle States on the east of the Alleghany Mountains, and in the adjacent parts of Canada.

There is no material change apparent in the vast region of the Ohio Valley; while there is an apparent falling off of the mean annual rainfall in the South Atlantic region.

We conclude from a careful examination of these records that there has been no material change in the mean annual precipitation of rain since the commencement of the records.

And this is the view which Professor Loomis of New Haven, and the Central Park Commissioners of New York, for 1871, held upon this question, before the observations by the medical department

had been collected and tabulated by Professor Henry.

Professor Loomis concludes that there has been no change in the average rainfall when long periods of time are compared, however the annual amount may vary.

We find, then, that man has had no agency in causing a decrease of the rainfall; but, on the other hand, that the rainfall is actually greater, and has steadily increased since the year 1818, in the very district which he has stripped of its clothing of forest, viz: in New England and in the Middle States.

We find that the causes of the precipitation of the rainfall must be extra-mundane in their origin, and too gradual in their operation for us, with but a brief space of earth's records before us, to discover any change in their results.

Continuous observations of temperature in our country have been made by the medical officers of the United States Army since 1822; and these records are quite voluminous. The fluctuations of temperature are found to be quite uniform throughout the country.

Two or three years near 1812 are historically known as cold years, and a reference to this period shows them to have been more extreme than any since.

Next, in severity, comes the conspicuous cold years of 1835, '36 and '37.

The next coldest groups were 1823, '24 and 1843, '44.

The high temperature groups are 1825–30, 1844–48, and 1853.

These years were distinguished by very high temperature, and were uniformly far above the mean.

It is seen, from a careful study of the observations, that no evidence of periodicity, or of progressive movement is apparent in the temperature records.

As in the rainfall, there are two classes of non-periodic changes; one less frequent, and affecting longer periods; and another causing changes above or below the general line of these long periods, and belonging to periods of a year or two.

The observations made by the State of New York upon temperature, show that during five decennial periods, from 1817 to 1867, the Hudson River has been frozen for 92, 92, 94, 90 and 91 days respectively. Hence there has been, in fifty years, no sensible change in the temperature of the Hudson Valley, though within that period a huge amount of forest has disappeared.

Since the fluctuations of temperature are quite uniform throughout the country, and as the records show no progressive movement in any direction, we conclude there has been no change in the climate as regards temperature, and that man's agency in influencing climate by changing temperature is not worth considering.

But the question of the rainfall or of the temperature does not settle the question of humidity. The humidity of the atmosphere depends chiefly upon the rapidity of the process of evaporation, and

upon drainage; and not upon the amount of the precipitation in rain and snow. Where evaporation goes on slowly, and there is but scanty means of drainage, the atmosphere will be humid. Where evaporation goes on rapidly, and the drainage is good, the atmosphere becomes rapidly dry. And it is here that man's agency comes in to modify climate. He may have no influence in determining the amount of the rainfall, but he has a mighty influence in determining the question whether the water which was deposited in rain shall remain on the surface of the earth and in the lower strata of the atmosphere.

We conclude that our climate has undergone a change, not in the temperature, nor in the rainfall, but in its humidity. We think, as the direct result of man's agency in felling the forests, in agriculture, in the building of canals and railroads, and in the introduction of a general system of drainage, that the atmosphere has become more dry.

It remains to be seen what influence this change may have upon disease. And first we must preface what we may have to say upon this subject, by the remark that it would be doing violence to the facts in the case to claim that the prevailing diseases of our country are owing exclusively to climate, because the predisposing causes of disease which are found in the habits, morals and race of its inhabitants are not to be overlooked in the etiology of diseases.

Again, medical skill is progressive as generation after generation of medical men contribute their experience to the store of medical truth, and its ad-

From pp 1 & p. 115

American Men: before 1850 at least,

Increase of Pop — doubly in 25 years —

Stature — witness army statistics —

Strength — Dr Woodbridge — 2000 pounds

~~Endurance~~ ~~Horror of pain~~ Forester — 100 miles

Harvard Nine — oarsmen — should have won Lincoln

In intellect — Webster — Clay — Calhoun — Statesmanship

Science — Henry — Peirce — Dana — Leidy — Agassiz — Poetry — Bryant — Longfellow — Whittier — Bret Harte

Everett & Eloquence — Beecher — Curtis — History — Irving, Prescott, Motley — Art — Powers — Story — Church:

& abundance of men who, in invention, — commercial enterprise, & all the work of life, are equal to any in the world.

No armies ever before showed the endurance of Americans, on both sides, during the great civil war. And the nation in which the telegraph was invented, — suspension bridges first used, — & the Pacific Railroad laid across the Continent — so fast a time, can now be rightly said to have begun to live. And Stock — whose stock may have been how

One fact only is discouraging: the diminishing productiveness of American women. Dr. Nathan Allen of Lowell, Mass. first pointed this out. N.Y. statistics confirm it, by the much greater number of children born where parents are foreigners.

In 1870, in N.Y., deaths of natives nearly double those of foreigners; births of children both of whose parents were foreign almost 4 to 3 of those of par. both native.

But, as thus, two things should be (2)
remarked. 1st, Not our climate, but our
national habits may be at fault, —
especially in cities; acting unfavorably on
the race, — by too much artificialness, &
too intense a struggle for existence &/or
advancement. 2nd, — fertility in numbers (1869)
is not always a sign of total vigor as a
stock. This is shown more by
quality than quantity.

(Gr)

Brown-Séquard thinks our American men generally bear traces from wounds & injuries better than those of Europe

Runs too much to brain & nerves — too little organic development. Physical culture is more [illegible] than [illegible] — abundant in women

British Child Mortality in India.

A correspondent of the *Pall Mall Gazette* in Calcutta writes: The most painful feature of British rule in India is the sacrifice of English children which it yearly involves. Some startling statistics have lately been published, which show that, in 1871, out of 11,000 soldiers' children in India, 40 per 1,000 were ill every day throughout the year, and that upward of 70 per 1,000 died. It is stated that one-third of the whole number of European children in India die under six months old; that eighty-five per cent. perish before they reach two years; and that out of 100 infants born only eleven attain maturity. The popular idea of Anglo-Indian life is that of an armed adult community which garrisons and rules over a conquered empire, and trades in its principal cities. As a matter of fact, the first thing that strikes a stranger is the absence of English child-life. On the other hand, the most prominent feature in an Indian graveyard is the number of children's graves. The little mounds cluster thickest, and out of all proportion to the ratio of children to adults in the barracks or in civil life. The burden of Indian existence falls with its most cruel weight upon the young. The human suffering and loss of English life which the Indian Empire yearly costs Great Britain takes place, not in the trenches nor on the battle-field, but upon the white cots of English children, where, every day, hundreds of poor little souls lie tossing with fever. An adult soldier represents too much money to allow of his being subjected to any avoidable risk, and his life is conserved on strictly financial grounds. But it is impossible to enter an Indian graveyard, which forms so essentially one of our insignia of empire, without thinking of the curse on the rebuilder of Jericho: "He shall lay the foundation thereof in his first-born, and in his youngest son shall he set up the

oth House.

ET STREETS.

assortment of

LOTHS

JACKETS.

RASS & CO.

ET STREETS

LONDON, July 10.—Mr. Hamilton, of the Irish Team, writes to the "Standard" endorsing Mr. Parsons letter of yesterday in reply to newspaper criticisms. He says: "I have shot against the American Team, both in the United States and Ireland. I can say, with confidence, there never has been any team in this country able to beat them. I don't mean that we have not as good individual shots, but their organization is simply perfect. D

SECOND MORAVIAN CHURCH, FRANK-
lin and Thompson streets.—Rev. H. S. Hoffman, Pastor, TO-MORROW, 10½ A. M., Sacrament of the Lord's Supper; 8 P. M., preaching by Rev. J. Max Hark, Pastor of Moravian Congregation at Lebanon, Pa.

The congregation will make its excursion to Bethlehem, Pa., on Thursday next, July 15th. Tickets for the round trip, only $1 50; children half fare. Arrangements have been made which will enable excursionists to visit and inspect all the points of interest in and about Bethlehem. Trains will leave North Penn. R. R. Depot, American and Berks sts., at 7.30 A. M. Come. *364

FIRST MORAVIAN CHURCH, FRANK-
lin and Wood sts. Rev. Edward Rond[illegible] 10½ A

ACCORDING to a recent work of Mr. B. A. Gould, Actuary to the United States Sanitary Commission, in which some very interesting figures relative to soldiers in the last war are given, it appears that the American nation, instead of being degenerate and inferior to the European race in point of physical perfection, is far the reverse. The figures adduced show that "the tallest men were from Michigan, Illinois and Wisconsin; the next tallest, New England, New York, New Jersey; and the shortest from Scotland, England, Germany." In weight, the men of Kentucky and Tennessee were the heaviest, averaging 150 pounds; England, Scotland, France, Belgium, all between 138 and 139 pounds. The ratio of weight to stature gave in pounds to the inch: Ohio and other western States, 2.185: New England, 2.121; England and Scotland, 2.118; Germany, 2.168.

The Schomacker Piano Forte Manufacturing Company announces a semi-annual dividend of 3 per cent, payable on demand.

—The Green and Coates streets Passenger Railway Company announces a dividend of per share, payable on the 15th instant.

—The Citizens' Passenger Railway (Tenth and Eleventh streets) announces a dividend $4½ per share, payable on demand.

—The coupons of the Union and Titusville Railroad Company, due 1st instant, are payable in this city.

NEW JERSEY MATTERS.

Brakeman Injured.—On Thursday night a man, named James D. Moran, a brakeman on the New Jersey Division of the Pennsylvania Railroad, was severely injured on the head while attending to his train, near Clark. He was brought to his home in

American Men

N.B. Irish team, same year, beat Everbest and Scotch at Wimbledon.

victory of "American Rifle Team"

Ireland,

1875.

Dollymount

In one individual contest, Col. Eldridge hit the bull's eye thrice in succession at 1000 yards distance.

European Life in India.—Dr. Cornish is the Sanitary Commissioner of Madras, and his *brochure* on the improvement in European life in India is a valuable contribution to this discussion. He states: "To obtain evidence on this subject we must seek for information in the statistical history of bodies of men exposed to continuous residence in the country, like the Indian Staff Corps, the civil and military services; and it would be somewhat strange if the ameliorated conditions of existence which have *reduced the mortality of the army* from 69 to 28 per 1,000 had exercised no influence in regard to the class of men who contribute to the profit of the insurance companies." All Dr. Cornish's arguments and facts go to prove there has been a very marked and decided improvement in the duration of European life, and he states that "the standard reports of Davis, Neison and Brown, from which the value of European life in India is usually computed, refer to the statistics of the past, to the time when soldiers died in the ratio of 69 per 1,000." To account for the change, he points out that formerly it was the practice to send out raw immature boys as writers, cornets, and ensigns; that the accommodations necessary under the circumstances of a change of climate were unknown, and that if a man fell ill he was badly tended, and often bled or purged to death. The great change which has taken place in the habits of Europeans, especially with respect to drinking customs, is well known, and the modern temperance accounts to a large extent for the longer life enjoyed. In the tables embodied in Dr. Cornish's pamphlet the reader must be struck with the very small proportion of deaths from chest diseases. In one schedule of 127 deaths, only five are due to respiratory disorders. On the other hand, the liver diseases and diseases of the nervous system figure heavily. It would appear that if the mortality from climatic disorders is greater than here, that from consumption, which so sadly thins the life assurance ranks in England, is extraordinarily light.—*London Insurance Agent.*

Dr. Mowat, in a *brochure* entitled *The Death Tribute of England to India*, confirms Dr. Cornish's views. He points out "a law of compensation in the incidence of sickness and mortality in the tropics as compared with temperate climates; the abdominal organs in the East taking the place of the contents of the chest in the western hemisphere in relation to disease and death." Dr. Mowat's figures, he states, "reduced into plain language," show that while consumption and lung disease cause about 46 out of every 100 deaths among the adult male population of England, in India, of British officers within the same limits of age, 5 in every 100 deaths are the result of "lung diseases."—*Insurance Monitor.*

inquired into the mortality of said fevers, as compared with the other districts of the city of New Orleans, until lately, when it became one of my duties, as sanitary inspector, to make my annual report to the Board of Health of the State of Louisiana. I found that the deaths from fevers due to malaria in 1874, numbered 484, of which 108 had occurred in the Charity Hospital, which received patients not only from the whole city, but from other parts of the State, and also from abroad; thus leaving a mortality of 276 which had occurred in this city, outside of said hospital. Of these, 162 were from the third municipal district, containing a population of about 45,000 inhabitants, and 224 in all the other districts, containing 147,000 inhabitants. The above figures having surprised me, and desiring to ascertain the cause of this greater ratio of mortality, I had a diagram of my district drawn, and proceeded to designate on it the locality of the various deaths from malarial fevers, and as soon as the work was completed, I found that this third district had an immense swamp at its rear, and on the northeast corner, and that it was the most incomplete in its drainage.

During nearly the whole summer the wind was from the north and northeast, and had thus driven the poisoned atmosphere of the swamps into this district, through the streets running from swamp to river.

This north wind had been very hot (it is always so in this city during the summer), having come to us after having swept over the whole heated continent north of us. The mean temperature for June, July, August, and September, was 89.471°. To the above influences, and to no other cause, could I attribute the great excess of the mortality from malarial fevers in this district. One hundred and twenty-two deaths occurred on streets running from swamp to river, and only forty on streets running parallel with the river. The corners of the streets were particularly unfortunate; in several instances deaths occurred on three of the four corners formed by the intersection of two streets.

During the week ending August 16th, the death rate of the city of New Orleans was more than doubled; the increased mortality was attributed by many to the excessive heat, and the week is since alluded to as the "heated term." In my opinion, heat itself was not the cause, but merely the means by which the quantity of malarial poison was increased and disseminated. If heat alone had been the active agent, the deaths would have occurred regardless of the direction of the streets, and if any were to have been more unfortunate, certainly those should on the streets parallel with river, which had little or no breeze, and received the continual rays of the sun from sunrise to sunset. Such was not the case, and on examining my records, I find that during the

INVALID CLIMATES.—A comparison of three places of invalid resort, Mentone, France, Aiken, South Carolina, and Anaheim, in Southern California, for the months of December, January and February, has been made by Francis S. Miles, of New York. He says that at Anaheim, an invalid could have been out of doors all day during 81 days, and would have been confined in doors by bad weather 9 days. At Mentone there were 67 fair days and 23 bad days, and at Aiken, 53 fair and 37 bad days. The average temperature at Anaheim, during the three winter months, was 61 degrees; at Mentone, 48⅓ degrees, and at Aiken, 53 degrees.

stealing a valise from the depot at Ni
and Green streets. John Woodington, e
ployed in the baggage-room at the dep
testified that the valise was taken at nig
but he did not know by whom. Some of
contents having been found in the posse
sion of Hickey, he was assumed to be t
thief, and was held for trial on the charg
as well as on the Manayunk robberies.

THE POLICE AND FIRE ALARM TEL
GRAPH COMMITTEE.—The Police and Fi
Alarm Telegraph Committee of Counci
met yesterday afternoon, Mr. Charles
Jones presiding. The extension of the tel
graph of the Department to the Jewis
Hospital was authorised. The report of t
Sub-committee on the introduction of a
improved system of police and fire alar
telegraph, recommending the creation

S. California

There are three spots in Southern California which possess a climate peculiarly adapted for incipient consumptives, viz: San Bernardino, at the foot of the Coast Mountains, and about sixty miles from Los Angeles, and Santa Barbara and San Diego, on the sea-coast. They all three lie between lat. 32° and 35° N., and have a very mild and equable winter climate, not liable to the trying vicissitudes of weather which render some sea-coast cities so exhausting to invalids. San Bernardino is described as being far superior in climate to Aiken or to the far-famed Mentone, the favorite resort of European consumptives and of those afflicted with throat disease. A case is cited of a gentleman who had been consumptive for some years, and had struggled for his life in a winter residence, for two years, at Nice and Mentone, and a third year at Aiken, in South Carolina. He was losing strength fast, and last summer suffered so severely from night sweats, sleeplessness, continual coughing and lack of appetite, that it was doubtful whether he would live through the winter anywhere. He went to San Bernardino, and by the following January, was able to travel sixty miles over a rough road, walk several miles the same evening, eat heartily and sleep well, with scarcely any cough at all. He attributes this surprising change entirely to the climate of the locality, and mentions many persons of both sexes who had reaped similar benefit from it. There is also the testimony of a physician who had removed from New York, where he was constantly prostrated by throat disease, to this new haven of convalescence, and there he soon recovered his health, and has retained it in perfect order ever since. San Bernardino has other advantages. Living is cheap there, and the scenery is picturesque and grand. It is accessible by steamer from San Francisco to Los Angeles, in thirty-six hours, and by stage from Los Angeles, sixty miles, in ten hours. San Diego possesses the mildest and sunniest climate on the coast, but it labors under the disadvantage of an almost entire absence of shade and trees. It is best during the winter months, and it has less rain during that time than any other place on the coast, and winter is the rainy season in California. Santa Barbara faces due south, and is the pleasantest place of the three. The harsh and foggy north and northwest winds, which make the coast north of Point Conception so disagreeable, are entirely cut off from it by the high coast range of mountains, which

eading Democratic journals as the World
ournal of Commerce. The former re-
: "For ourselves (since we are reduced
alternative) we altogether prefer Gree-
Grant; but there are multitudes of
crats who, in their present temper,
as soon have one of these Republicans
head of the Government as the other."
latter says: "To condemn General Grant
is corrupt and corrupting allies and
rters is one thing; to endorse Mr. Gree-
nd choose him and his possible familiars
succession, is quite another. * * For
ves, we may say frankly, that we can-
uit in the triumph of either side."
Stokes trial is nearing the end, and as
ale approaches the public interest in-
s. The court-room to-day was crowded
oment the doors were opened. Even
the recess, the spectators, among whom
many ladies, heroically retained their
hough the temperature was like that
oven.
prisoner wore his usual anxious look,
ccasionally betrayed symptoms of ner-
xcitement. His mother and sister occu-
place beside him, while his father and
r sat in the vicinity of the jury box.
witnesses were mostly physicians, who
reviously given evidence, and were
now to give rebutting testimony for
osecution, viz: Drs. Tripler, W. Shine,
on Buck, Sayre and Hammond. Patrick
Thomas L. Powers, Henry Keller and
Reischer, were also recalled, but they
othing of importance to tell that had
en told before.
Tremaine commenced summing up for
fence at 3 o'clock, and continued until
urt adjourned. He contended that the
uld not find the prisoner guilty of mur-
less they were satisfied that he killed
ed with a premeditated design to effect
uth; they must also be satisfied that de-
died from the effects of the pistol
; that there was no justifiable cause for
the pistol, and that at the time of the
the prisoner was not insane.
lso made the point that the killing of
ceased would be justifiable, and the ver-
the jury should be not guilty, provided
hould find that at the time of firing the
sed had a pistol in his hand and was ap-
tly preparing to fire at the prisoner, and
risoner believed he was in imminent
r of losing his own life or of sustaining
bodily harm from the firing of such
l.
Tremaine will resume his argument to-
ow. The District Attorney will then
w, and the expectation is that Judge In-
m will charge the jury before the close of
ay, so that it is probable a verdict will be
red by Saturday at the farthest.
Times has now received subscriptions
e amount of $2556 for its picnic project
e poor children of the lower wards of the
To-day the first excursion took place,
ildren being taken by ferry and railroad
Oriental Grove, L. I. The quartermas-
partment provided 2000 sandwiches, 700
50 quarts of ice cream, 800 pounds of
ox of lemons, 200 quarts of [illegible]
[illegible]

The Climate of Florida.

Mr. SOLON ROBINSON, for many years agricultural editor of the New York *Tribune*, writes from Jacksonville, Florida, to that paper, under date of November 18th, 1874:—

"I will simply say to those who need to visit a milder climate for health, you cannot come too early nor stay too late. I fully believe the summers here would be more beneficial to invalids than winter, and there is no more difficulty in ability to endure the heat than at New York or Boston. The summer nights are undoubtedly more comfortable here than there, and the country is not a sickly one. Fever and ague prevail in dangerous localities, but generally of a mild form. As to the cost of living for families here, it is considerably less than at or near New York, according to the figures upon my family expense book in both places. Those who are not invalids, and who would come here for pleasure or to avoid the rigor of a Northern winter, and enjoy a climate that is not merely delightful, but one that has not five days in all the winter and spring months that those in delicate health cannot enjoy out doors, may, will, and do come here at all times from October to May. No one, sick or well, should come here in winter with only summer garments.

"The winter climate of all East Florida is unequaled in America, if it is in the world, being generally mild and remarkably dry, owing to an absorbent sandy soil, which swallows the few showers that fall, so that a lady can walk out in thin shoes half an hour after the rain ceases. But the nights are cool, and some of the days, so that a garb suitable to autumn weather in New England is in order here. Heavy overcoats and shawls and furs are seldom worn. Flannels are a necessity. For hotel life, the expenses here are just about par with the North, ranging $2.50 to $4.50 a day, or $15 to $21 a week, exclusive of 'extras.' We have in Jacksonville two leading hotels, which charge first-class prices and give satisfaction; also, half-a-dozen smaller hotels and a variety of boarding-houses at $7 to $15 a week, besides numerous private families that take from one to ten boarders during 'the season.' In private families I think prices will average $10 a week, with a good table and good bed-rooms, fires sometimes included.

"The same statement will answer also for St. Augustine, Palatka, and Green Cove Springs, which are the principal places of resort. At several other places on the St. John's and on the coast, there are boarding-houses. Those at Magnolia and Enterprise are extensive. A few visitors go to places in the interior and find accommodations at town rates; but as winter is the harvest time, visitors would not expect to find rates distressingly low—that term is more likely to be applied to the fare.

"A good many people who visit Florida spend some weeks very pleasantly 'roughing it' in tent life; the weather being admirably suited to the purpose. I spent the whole month of March one year in an open boat voyage up the river, camping in the woods with no shelter besides a pair of rubber blankets, which were sufficient, as we had only one light shower and no frosty nights."

A writer in a late number of *Scribner's Magazine* says:—"The climate of Florida is undoubtedly its chief charm. Its beauties and virtues have for a hundred years filled the homes of St. Augustine with people striving to recover from the effects of severe surroundings. The equable temperature is one of the great excellences of the climate. The thermometer rarely falls below thirty degrees, or rises above ninety-five degrees. The mean temperature of the winter months at St. Augustine for one hundred years, according to the old Spanish records, averaged a little over sixty degrees. The climate of the State is of course varied, as it extends through six degrees of latitude. The greatest heats in summer are never equal to those experienced in New York and Boston. One writer, who is considered good authority, says that during his eighteen years of residence in Florida, the greatest heat was ninety-six degrees in the shade. The climate of the whole State, from October to June, has been characterized as 'one continuous spring.' Periods of cold or frost never last but a few hours, and rarely come, save in January, once or twice. The nights, whatever the character of the days preceding them, are always cool. Both the winter and summer weather in East Florida are delightful. The winters in that section are so mild that 'the most delicate vegetables and plants of the Caribbean Islands,' says one writer, 'experience there not the least injury from the season;' and the orange, the plantain, the banana, the guava, and the pine-apple attain a luxuriant growth. The medical statistics of the army show that the climate of the State, as a whole, ranks pre-eminent in point of salubrity.

"Frost reaches all parts of the State on rare occasions, but has seldom been known to go below latitude twenty-seven degrees. It has sometimes visited Jacksonville and other points along the St. John's river when the mercury stood at forty degrees. The seasons are the wet and the dry; the rains, which come with astonishing regularity at certain hours during the summer days, fall in heavy showers, and leave a cloudless sky behind them. There is rarely any rain during the winter months."

WILLIAM CULLEN BRYANT, the poet, writing from St. Augustine in April, 1843, says:—"During the sixteen days of my residence here, the weather has certainly been as delightful as I could imagine. We have the temperature of early June, as June is known in New York. The mornings are sometimes a little sultry, but after two or three hours a fresh breeze comes in from the sea, sweeping through the broad piazzas, and breathing in at the windows. At this season it comes laden with the fragrance of the flowers of the Pride of India, and sometimes of the orange tree, and sometimes brings the scent of roses now in bloom. The nights are gratefully cool; and I have been told by a person who has lived here many years, that there are very few nights in summer when you can sleep without a blanket.

"An acquaintance of mine, an invalid, who has tried various climates, and has kept up a kind of running fight with death for many years, retreating from country to country as he pursued, declares to me that the winter climate of St. Augustine is to be preferred to that of any part of Europe, even that of Sicily, and that it is better than the climate of the West Indies. He finds it genial and equable, at the same time that it is not enfeebling. The summer heats are prevented from being intense by the sea-breeze of which I have spoken. I have looked over the work of Dr. Forry on the climate of the United States, and have been surprised to see the uniformity of climate which he ascribes to Key West. As appears by the observations he has collected, the seasons at that place glide into each other by the softest gradations; and the heat never, even in midsummer, reaches that extreme which is felt in the higher latitudes of the American continent. The climate of Florida is, in fact, an insular climate; the Atlantic on the east and the Gulf of Mexico on the west, temper the airs that blow over it, making them cooler in summer and warmer in winter. I do not wonder, therefore, that it is so much the resort of invalids. It would be more so if the softness of its atmosphere and the beauty and serenity of its seasons were more generally known."

ATTENTION

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"	"	" Washington,	2 50
"	Philadelphia	" Baltimore,	1 10
"	"	" Washington,	1 75
"	Baltimore	" Washington,	75

TIME TABLE SOUTHWARD.

Leave New York, . .	9.25 A. M.
" West Philadelphia,	12.10 P. M.
" Baltimore, . .	3.00 "
Arrive Washington, . .	4.10 "

TIME TABLE NORTHWARD.

Leave Washington, . .	9.30 A. M.
" Baltimore, . .	10.40 "
" Philadelphia, . .	1.30 P. M.
Arrive New York, . .	4.10 "

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PENNSYLVANIA
RAILROAD.

FLORIDA
Excursion Routes
SEASON OF 1874-5

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FOR SALE DECEMBER 1st, 1874, to APRIL 1st, 1875,

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ROUTE No. 514.—Via Washington, Lynchburg, Charlotte, Augusta, and Savannah.
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All of the above-described Tickets RETURN BY SAME ROUTE, and are sold at following

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Elizabeth,	49 75	Altoona, (Route No. 546 and No. 547 excepted.)	50 75
Rahway,	49 50	Pittsburg, (Route No. 546 and No. 547 excepted.)	52 75
New Brunswick,	49 00		

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ELIZABETH—Depot.

RAHWAY—Depot.

NEW BRUNSWICK—Depot.

TRENTON—Depot.

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With the Compliments of

DR. W. GLEITSMANN.

See pp. 7 & 8

ON ALTITUDE AND CLIMATE

IN THE

Treatment of Pulmonary Phthisis.

— Dr. Duchaillé a pamphlet also

N.B.
1813, N. Orleans had 200,000 popula.,
7505 deaths, of which 800 were from consumption
San. Diego Co., Calif. same year 9000 popula,
53 deaths, 13 of the Consumptions
Of deaths, N.O., 11 in 1000 consump, S.D. 24 = 1000
Of population, N.O. more than 4 in 1000, S.D. 1 1/3.

ON ALTITUDE AND CLIMATE

IN THE

TREATMENT OF PULMONARY PHTHISIS.

By W. GLEITSMANN, M. D.

(Recently of Baltimore,)

Physician in Charge of the Mountain Sanitarium for Pulmonary Diseases, Asheville, N. C.

AUTHOR OF STATISTICS OF MORTALITY FROM PULMONARY PHTHISIS IN THE UNITED STATES AND IN EUROPE, ETC., ETC.

Reprinted from the Transactions of the Medical and Chirurgical Faculty of Maryland, April, 1875.

BALTIMORE:
INNES & COMPANY, PRINTERS AND BINDERS.
1875.

ON ALTITUDE AND CLIMATE

IN THE

TREATMENT OF PULMONARY PHTHISIS.

In order to understand fully the value of a pathological view or the merit of a therapeutic method, it is necessary to study the different changes through which they have passed in their history. By these means we learn not only the growth of a theory out of others, but also the errors it has overcome, and are thereby enabled to guard ourselves against them in the future.

The theory in question, which engages the deep attention of the medical profession in the last decades, was thus not perfect at its origin, but had to go through many phases before it gained its present basis. Without entering into the details of ancient history, it is only just to remark that opinions then changed in the same succession as they did sixteen hundred years later. Celsus (30 A. C. to 40 A. D.) recommended the sea-climate, Aretaeus (50 A. D.) sea voyages, whilst Galen (131 to 201 A. D.) first advised elevated regions for consumptives. With the exception of a few writers, almost fully 1600 years passed over from that time till the subject was again taken up by modern scientists.

We can count the reopening of the study of the influence of climate from the past century. As our present auxiliaries in the diagnosis of the disease could not then be made available, the presence of phthisis was generally ascertained only at a time when we now call it fully developed, and when devastations of the lung tissue are already present. The difficulties in travelling at these times induced the sick to make trips on sea, and to go to warm, sunny places, where the weak, debilitated patient felt at ease. If we call this the preliminary period of modern climato-therapeutics, we can distinguish since the second decade of our present century three different periods. The first is marked by the importance which was attributed to the factor of temperature, and may be called the

symptomatical period; the second, the specific period, took again only one factor in consideration, viz., altitude, and neglected all others; whilst the third, the physiological one, takes besides the main factor of altitude, due notice of all the different elements which, according to the progress of climatological science, form in their combination "climate." We will see hereafter how these views, seemingly contradictory, generated one another, and in what relation they were to the prevailing pathological opinions of the nature of the disease.

The medical school of the first of these periods was guided by the desire to act in a mild, antiphlogistic, sedative manner. As the tendency of this time was inclined to treatment mostly against the symptoms of a disease, and as the opinion prevailed that a symptomatical treatment was about all that was possible in such cases, the patients were sent to places with warm climate. There were, at the same time, fantastical imaginations of the beauty of the southern climates and the miraculous effect of their balsamic air. Prominent French and German scientists, as for instance Baillie, Broussais, Stieglitz, Hufeland, adhered to this theory. The value of this school was based in the often instantaneous relief of the patient's symptoms and the greater comfort of life, attained by the care used by the sufferer. Meanwhile the study of climatology progressed more and more, differences between climates of various places were developed, and the elements constituting "climate in general" were more carefully differentiated. The frequently unsatisfactory and even bad results of this period, the impossibility to act upon the disease itself, led to an overthrow of existing opinions and formed the transit to the second period.

The so-called specific period attached the main therapeutic value to the diminished pressure of air. Its views are mechanical, and their tendency is towards stimulation against the defective development of the heart and of the apex of the lungs. On its basis originated the idea of prophylaxis, which could not satisfactorily be solved by the antecedent period.

The pathologico-anatomical conception of this era was founded upon Laennec's doctrine, which traced the ultimate lesion to specific tuberculosis of the lungs, and miliary growths previous to softening. Whilst climatic treatment by altitude had already

gained popularity in foreign countries, its development progressed more slowly in Europe. The attention of the French nation was attracted to the sanitary value of altitude at the time of the Mexican war, and by the increasing reputation of the watering-places of the Pyrenees. Laennec's theories were introduced in England by Clark and Stokes. In India, sanitariums sprang up in the mountain regions, in order to meet the local want of European military and civil officers for retreats affording alleviation from the pernicious influence of the tropical climate; they, however, never were exclusively devoted to pulmonary diseases. At this period the Spanish inhabitants of South America commenced to make use of the mountain terraces of the Andes, not so much as summer resorts, as for sanitariums for consumptives. But the most thorough investigation was accorded to Laennec's views in Germany, where the theory of altitude also received the same searching attention. Schœnlein, Canstatt, Rokitansky, built up the doctrine of Crasis; but in whatever classification we may arrange tuberculosis, be it as gray or yellow tubercle, inflammatory, cancerous, typhoid or sarcomatous tuberculisation, still the tendency to the specificity of the disease maintained its predominance, in accordance with which we observe the search for specific treatment, as is illustrated by the advocacy of rarefied air. At the same time climatology and medical geography became subjects of earnest study, and amongst the fruits of this period we may enumerate the well-known works of Fuchs, and particularly Mühry in Germany, Jourdanet in France, Herrmann Weber in England, Archibald Smith in America. Without further entering into these labors (which I have done in a previous paper, published in the *Richmond and Louisville Medical Journal*), the general fact was elicited from them, that the existence of phthisis diminishes, or even ceases altogether, with the increase of elevation above the sea-level, and that this boundary is higher in the tropics than in the temperate zones. In this connection mention must be made of two works, one of them still belonging to this period, whilst the other is of more recent date. Both embrace small, though well-known sections of country, and furnish concise information of all inhabited places according to elevation, number of inhabitants and of deaths from phthisis, in a variety of tables. In this way Küchenmeister has investigated

the kingdom of Saxony, and Corval the Grand Duchy of Baden, and both found a uniform corroboration of the laws set forth, even on so limited a scale. As a peculiar feature of this period we remark the theory of absolute immunity, which was carried to the length of asserting a simple means of calculating the sanitary elevation of various places according to their latitude. But it was this very exclusiveness which, by ignoring all other factors, created the necessity of a modification. The appreciation of the value of the other agencies entering into the idea of climate, added these to the simple element of altitude, and led to the present state of the theory.

In 1864 Vivenot published a work attempting to illustrate the relative humidity of atmosphere, and to give it prominence as a means of classification. Considering the great variability of this factor, the inconsistency of its prominence soon became evident, and atmospheric pressure had to be retained as classifying means, because it possesses the greatest constancy and is subject to the least amount of variation as a chief factor; whilst, moreover, evaporation and temperature are dependent upon it. Nevertheless an impulse had been given to the separate study and application of the value of each of the various auxiliary climatic agencies in the treatment of phthisis. By the observation and labor thus developed, we are introduced to the—

Third or physiological period. The therapeutic character of this period may best be designated as alterative. The views of the pathology of phthisis now received a broader and firmer basis through Virchow, in his Cellular Pathology. About the middle of the last decade the clinical doctrines of Niemeyer regarding caseous pneumonia, its nature and termination, and its relation to scrofula and miliary tubercle, created an era in practical medicine. In like manner, as pathological conceptions became broader, the idea of climate also developed. Apart from the degree of atmospheric humidity, temperature was more generally taken into consideration, as sudden and frequent changes of temperature have been found to exert a deleterious influence upon the organs of the chest. Besides, as Weber very aptly remarks, a number of other conditions must be taken into account in estimating the therapeutic or sanitary value of a locality, as for instance the situation on

tableland or on top of a hill, on the slope or in a valley; the aspect to the south, west, north, or east; the configuration and height of surrounding mountains, the nearness or absence of sheets of standing water, the occurrence or absence of fogs, the number of clear days, the geological formation. Although this third period forms a complete system in itself, we yet meet with a certain overcrowding and want of arrangement. Since efforts were made by the school of the second period to modify and enlarge the exclusiveness of its theory, these two schools now both exist in society, though not entirely assimilated. To harmonise these views in asserting the truths and rejecting the errors of each, is the task of the present day. Many willing and active workers in hygiene and climatology are co-operating in this work. It is to be hoped that by this means we shall be able to increase and perfect our knowledge of the general and special matters of inquiry, and by a combination and comparison of general results, obtain reliable data for judgment in particular cases.

In addition, permit me, gentlemen, to submit a few remarks upon the effects of climate on consumptives. I shall confine myself to the two chief therapeutic elements, prominent in the first and two last periods, that is, southern and mountain climate. In regard to the former, the idea is generally accepted that patients in such climates are supposed to be able to spend the greater part of the day in the open air, without risk of taking cold. Since in lower, southerly latitudes at least, they can fulfil the essential condition of unlimited use of fresh, pure air, we are compelled to consider results in order to be able to institute comparisons with the effects of mountain climate. We find the success attained in southern climates alone, without altitude, confined to relief of symptoms, only warding off fresh injury. The patient, after returning home, has not acquired that power of resistance which alone can prevent a new bronchial catarrh or fresh catarrhal inflammation attacking the alveolæ of the lungs. As much as ever he is exposed to the same danger of a relapse from the same causes, or is perhaps inclined to it in a still higher degree, as the warm, humid atmosphere has served more to enervate than to invigorate his system. As to the influence of the climate itself, Mittermeir, one of its prominent eulogists, concedes, regarding that old and well-known

representative, the Island of Madeira, that consumptives with caverns and fever very rapidly grow worse there. Every practitioner, however, is well aware that the generality of cases of phthisis only come to his knowledge when fever already exists and caverns are at least probable.

In considering the mountain climate, we observe the great prophylactic advantage it affords in cases of hereditary or latent disease. We shall see hereafter what influence the mountain climate will bring to bear on defective development of the organs of the chest. We note, furthermore, that the patient is able to continue his treatment in summer-time also, and we shall find that he can enjoy the open air just as frequently and without injury in winter-time. If, for instance, we proceed to compare Davos, a mountain resort in Switzerland which has come much into note of late, with the warm winter resort Meran, situated in southern Tyrol, we are at once struck with the following meteorological observations: At Davos the thermometer rose to 28° Celsius (82° F.) in the sun on warm, bright days in winter; and the number of days during which the patients were able to sit in the sun from 10 A. M. to 3 P. M. averaged during five years:

	Davos.	Meran.
November	18	13
December	16	16
January	19	16
February	19	14
March	18	13
	90	72

Consequently an excess of 18 days in the mountain over the southern resort. Those mountain resorts that are situated in more southern latitudes, and consequently have a milder winter than Davos, will show even more favorable conditions. In direct relation to intercurrent diseases, Dr. H. Weber has published clinical records, kept with the utmost accuracy, instituting comparisons between patients who had in part visited the mountains, in part the south. Amongst the 17 cases whose history he gives, there are 10 who have spent one, or several seasons in southern health resorts. All these 10 said that they had been much more free from intercurrent acute affections on the high level than on the

low level places; but of 5 he gives the following astonishing data: These 5 cases spent an aggregate time of about 80 months in low level, and almost 160 in high level health resorts; of these 80 months they were confined nearly 20 months, or ¼ of the whole time, to their rooms or beds on account of intercurrent diseases, especially bronchitis, pneumonia, pleuritis, rheumatic fever and haemoptysis, while of the 160 months on high ground they were confined for the same reason less than 10 months, therefore not quite one-sixteenth of the time. And alluding to the fear that mountain air may dispose to haemoptysis on account of diminished atmospheric pressure, Weber again says that among the 17 cases whose history is given, and 14 others still under observation, only one had a slight haemoptysis while residing on high level; and amongst these 31 cases there are twelve who had from 1 to 4 serious attacks while residing in low elevation. These observations are corroborated by others.

The general effect of mountain climate, considering its tendencies as a whole, must be characterised as an active one, since increased demands are made upon the functions of the organism from all sides, both mechanical, chemical and dynamic. The diminished pressure of the air acts mechanically, the evaporation chemically, the temperature dynamically. The pressure upon the total surface of the body is lessened, and more margin allowed for expansion and absorption of fluids. At the same time the inner pressure upon the lungs is weaker, and their contractile elasticity meets fewer checks. In order to overcome this, a greater degree of mechanical muscular force is required to perform the act of inspiration; respiration receives an active impetus. Apart from this mechanical influence upon the muscular action and contractile tissue, the rarefied air has another and similar one upon the gaseous contents of the blood. As the carbonic acid escapes more readily, the blood in the affected lungs can better divest itself of it, and the tissue change is indirectly aided. Moreover, we observe a secondary physiological effect upon the motion of the blood. Owing to the constant gymnastic exercise of the respiratory organs, the walls of the thorax expand and the air channels are better filled and ventilated. The blood channels, particularly of the capillaries, expand; these latter become straighter, and their resistance to cir-

culation decreases. If now the relief afforded the circulation strengthens the heart muscle, and the change of air in the lungs is made more thorough and extensive, results are attained which are to the sick health, and to the already well, development. Taking the increased force and rapidity of the blood-wave, and the consequently greater abundance of blood in the lungs, as a basis, Dr. Brehmer has founded his theory of the treatment of phthisis, and proved its correctness by the most brilliant results. I will only repeat what I have already alluded to elsewhere, that with an average treatment of 86 days he permanently cured 20 per cent. of his patients.

The constantly lower temperature of the mountains is a stimulant to the physiological production of body-heat, as a consequence of its perpetual withdrawal. It has at the same time an important effect upon the energy of the nervous system and upon the contraction of the tissues. The lower humidity of the air induces a greater amount of watery substances to pass from the body in form of vapor through the skin and lungs, consequently the tendency to perspiration is diminished and the mucous membranes are more dry. This evaporation, however, by withdrawing water and warmth, induces a local cooling off through change of water into vapor, which cooling must be perpetually compensated by a general production of warmth.

I pass over without further mention the other special conditions and attributes of mountain climates, since the same are too variable to be considered in a general view. In the choice of a locality, such conditions as geological formation of soil, aspect, vegetation, social conditions, all must be consulted, together with many other points.

After having briefly sketched the history and beneficial effects of mountain climate upon phthisis, I venture permission to express the hope that these questions may before long receive the same appreciation and attention in this country as they have elsewhere obtained. The field is vast, and many difficulties lie in the path of investigation; but the solution of these problems will be received with so much more joy and gratitude by suffering humanity.